U.S. TREASURY DEPARTMENT - - - COAST GUARD

BULLETIN No. 49

REPORT OF THE INTERNATIONAL ICE PATROL SERVICE IN THE NORTH ATLANTIC OCEAN - [SEASON of 1963]

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REPORT OF THE INTERNATIONAL ICE PATROL SERVICE

IN THE

NORTH ATLANTIC OCEAN

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CG-188-18

Season of 1963

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PREFACE

This bulletin is the annual report of the International Ice Patrol Service for 1963. This bulletin is divided into two parts. The first is a report of the ice patrol operations from 7 March to 21 June 1963. Aircraft and communication activities are described and special sections deal with observed monthly ice conditions and statistics on ice and weather reports from shipping for 1963. There is also a special section on preseason northern iceberg surveys.

The second part comprises a presentation of the oceanographic data collected during the 1963 ice season in the Grand Banks region and the Labrador Sea. Included are charts of dynamic topography of the sea surface (ocean current maps), tables of oceanographic data, and a brief discussion of the results of each survey.

The authors of the section on physical oceanography are Alfred P. Franceschetti, Oceanographer, USCG; LCDR V. W. Driggers, USCG; and LT R. M. O'Hagan, USCGR. The section on nutrient distribution was written by David A. McGill and Nathaniel Corwin, both of the Woods Hole Oceanographic Institution, and that on the polyethylene bottles by LCDR V. W. Driggers. The remainder was written by LCDR R. E. Lenczyk, USCG.

With the publication of the report for the 1964 season, this bulletin will be revised in format. In its present conformation, distribution of the annual report is significantly delayed because of the time required to process and analyze the oceanographic data. The report of the operational phase of the International Ice Patrol Service, including the narrative report of activities and ice conditions and descriptions of research into the operational problems, will continue to be published in this series. The sections describing the physical oceanography of the Grand Banks region and the Labrador Sea and oceanographic research will be published separately in a recently established series: U.S. Coast Guard Oceanographic Reports, CG–373.

INTERNATIONAL ICE PATROL, 1963

In 1963, for the 44th year since 1913, the International Ice Patrol was conducted on the North Atlantic Ocean in the vicinity of the Grand Banks of Newfoundland by U.S. Coast Guard operating forces. Full services of the International Ice Patrol were provided from 6 March to 21 June. Ice observation was conducted by aircraft from 13 January through 23 July. An estimated 25 bergs drifted south of 48° N. during the year as compared to the annual average of 392 bergs since 1900, labeling 1963 as a very light iceberg year.

Capt. Julius E. Richey, USCG, was assigned the duties of Commander, International Ice Patrol. Operating forces assigned to the Commander included the U.S. Coast Guard Air Detachment, Argentia, Newfoundland (Commander, Glenn O. Thompson, USCG); U.S. Coast Guard radio station NIK, Argentia (RELE–2 Hershel A. Drury, USCG); U.S. Coast Guard cutter *Evergreen*, oceanographic vessel (Commander C. S. Changaris, USCG); and the U.S. Coast Guard cutters *Acushnet* (Commander N. E. Westfall, USCG) and *Tamaroa* (Commander H. A. Campbell, USCG), standby patrol vessels. The *Tamaroa* was relieved as standby patrol vessel in March by the U.S. Coast Guard cutters *Chilula* and *Cherokee*, respectively; however, for the fourth successive season and the 12th of the last 14 seasons the standby patrol vessels were not required.

The primary source of ice information in the area for which Commander, International Ice Patrol, is responsible was from planned aerial reconnaissance. A secondary and indispensable source of ice information consisted of reports from the merchant and Government vessels of various nationalities. The Canadian Department of Transport Ice Forecast Office, Halifax, Nova Scotia, and the U.S. Navy also furnished valuable ice information.

For the first time Commander, International Ice Patrol, made northern aerial ice observation flights to determine the Grand Banks iceberg potential for the coming ice season. These flights were conducted along the Labrador coast, across Hudson Strait to Frobisher, Baffin Island, on 13–14 January and again on 13–14 March. These flights indicated a very light iceberg year. Considerable valuable information about berg drift rates, berg mortality, and deterioration was obtained as a result of these flights. For details, see another section of this bulletin.

Commander, International Ice Patrol, and staff moved to U.S. Naval Station, Argentia, Newfoundland, on 4 March and commenced providing full services of the International Ice Patrol on 6 March, including aerial ice reconnaissance, twice-daily ice broadcasts to shipping by NIK, and the transmission of twice-daily ice bulletins to U.S. Naval Oceanographic Office, Washington, D.C., and others for further dissemination. At this time, young sea ice had just invaded the northern Grand Banks to eastern limits at 48° W. and southern limits along 47°10′ N. There were no known bergs south of 49° N. and only a few estimated farther north as far as Hamilton Inlet. Throughout March strong northwesterly circulation with attendant colder than normal temperatures dominated the area, maintaining rather constant sea ice limits and driving the few bergs from along the Labrador coast toward the Grand Banks at a rate of about 20 miles per day. It is very fortunate indeed that the available supply of bergs was extremely limited, for if the usual or average amount of bergs were available between the Grand Banks and Labrador coast for this time of year, an extensive and heavy berg threat would have developed on the Grand Banks and vicinity, especially with the existing below-normal surface water temperatures.

On the basis of flights on 13 and 14 March, there were approximately 50 bergs south of Hamilton Inlet. These bergs began arriving on the northern Grand Banks about the 20th of the month and continued intermittently until mid-April. The first 35-or-so bergs were for the most part small and badly eroded, with about half of them deteriorating before they were able to cross 48° N. Of the 35 bergs, one was very large and six were medium sized. The large berg was first sighted aground on 23 March near 48°30′ N., 52° W., with an estimated height of 225 feet and length of 600 feet. It was subsequently sighted and reported several times as it alternately grounded and drifted along the 100-fathom curve in the Labrador Current out to sea.

The weather pattern abruptly changed in April, with onshore northeasterly winds predominating over the entire area from the northern Grand Banks well up the Labrador coast. The type of iceberg season for the Grand Banks was now quite well identified. The estimated 15 stragglers, which had arrived off the Newfoundland coast just north of the Grand Banks about 10 April, were driven aground along the coast or into the bays from Fogo Island to Cape Broyle. These bergs lasted much longer in the colder coastal waters than those which had been driven out to sea shortly before. Undoubtedly the many bergs estimated between 53°30′ N. and 55° N. in early April were driven aground, delaying their transport to the south in the Labrador Current. It now appeared that the main threat to the major transatlantic shipping lanes for 1963 existed in the form of the one large berg and six medium-sized bergs previously mentioned. The

large berg had drifted to near 46° N., 48° W., by 21 April where it grounded for a couple of days. By now the berg, though still large, was badly eroded, with three distinct pinnacles and one column all separated at the water surface. Three days later, the one large berg had disintegrated into four small bergs, which were sighted 50 miles to the southeast. These small bergs, now out of the Labrador Current, drifted aimlessly in the area and deteriorated within 10 days without achieving any drift south of 45° N. The six medium-sized bergs were driven by predominantly north-to-northeasterly winds onto the northeast Banks where they grounded and slowly disintegrated in average water temperatures of about 34° F. By 15 May there were no remaining offshore bergs on the Grand Banks, and except for a couple of bergs close along Avalon Peninsula, the Grand Banks were ice free at this time and expected to so remain until June.

The onshore winds in the area north of the Grand Banks continued through the first week of May, but then shifted to the west-southwest and so remained until the end of May. Consequently by 10 May, many bergs were reported arriving near Belle Isle. As a flight on 24 May revealed, these bergs, under the influence of west-southwest winds, made negligible progress to the south. At this time there were about 325 bergs well spread out from just south of Belle Isle to 55°40′ N. between the coast and 50° W. In spite of average northerly winds during the first half of June, only a handful were able to drift into the vicinity of the northern Grand Banks with a minor threat to track F in late June and early July. By mid-July there were no known bergs remaining south of 50° N.

The limits of sea ice on the northern Grand Banks in March were fairly static, with the young ice, mostly brash and small floes due to heavy sea conditions, quickly disintegrating as it drifted out to sea into waters warmer than 32° F. This deterioration was almost matched by the supply provided by the west-northwest winds and east-flowing Labrador Current. By mid-April the sea ice limits had retreated to just north of the northwest Grand Banks near Cape Bonavista. By the end of April the Grand Banks was free of all sea ice, with limits to the north of Cape Freels close along the coasts of Newfoundland and Labrador. By 19 May, Belle Isle Strait was considered navigable and by 24 May the strait and approaches from east were open water. This is a month ahead of the average opening date.

The Gulf of St. Lawrence, including Cabot Strait and the Northeast Arm, experienced a relatively light ice year, with the steamer track from Cape Ray into the St. Lawrence River declared navigable on 29 March. Detailed monthly ice conditions appear in a later section.

It is to be noted that the International Ice Patrol Office, comprised of a small permanent nucleus of personnel, was officially established on a year-round basis at Argentia, Newfoundland, on 1 October 1963. Commanding Officer, Coast Guard Air Detachment, Argentia, has been designated Commander, International Ice Patrol. While the establishment of the International Ice Patrol Office at Argentia on a year-round basis does not necessarily mean that the International Ice Patrol will expand its activities or increase the duration of the active Ice Patrol, it should result in a more efficient operation of the Ice Patrol.

Table 1. Number of Bergs Drifting South of 48° N. by Month for 1963, and Average Since 1900

Month	1963	Average (since 1900)
January	0	2
February	0	10
March	4	38
April	20	100
May	0	140
June	1	66
July	0	19
August through December	0	17
Total	25	392

AERIAL ICE OBSERVATION

This year was marked by the record low total of Ice Patrol flights and flight-hours since aircraft were first used for aerial ice reconnaissance. A total of 24 flights involving 163.5 hours were made during the season as compared to 27 flights, 198.2 hours, in 1951 and 30 flights, 197.7 hours, in 1958. The years 1958 and 1951 were the two lightest iceberg years in the past 20 years. The main reason for the record low flights and hours in 1963 is the fact that the season was very light and iceberg threat to the Grand Banks was mainly concentrated from mid-March to Mid-May instead of being spread out over 3 or 4 months. Flights were flown an average of once every 4 days, with an average of 1,164 miles and 6.8 hours for each flight.

Aerial ice reconnaissance was performed mainly by two Lockheed Hercules (HC–130B) aircraft of the U.S. Coast Guard Air Detachment, Argentia. Two flights were made by a Douglas Skymaster (R5D) deployed temporarily in April from the U.S. Coast Guard Air Station, Elizabeth City, N.C., and six flights by an HC–130B from U.S. Coast Guard Air Station, San Francisco, manned by Argentia crews. The latter aircraft were deployed to Argentia in April when both Argentia HC–130B aircraft were undergoing wing repairs. Generally, the Hercules proved itself to be superior to the Skymaster for aerial ice reconnaissance. The main advantages of the Hercules are better ice-observing facilities and greater speed and range available. Usually two trained observers were assigned each flight. The Her-

cules aircraft were equipped with the usual radar and loran receivers and additionally with the new Doppler Navigation System. The goal of navigational accuracy from Ice Patrol aircraft is plus or minus 1 mile. The navigation by loran does approach this accuracy in some areas, but in many areas on the Grand Banks and vicinity this accuracy cannot be attained. The Doppler Navigational System was expected to solve the navigation problem, but after 1 year's use on Ice Patrol, it must be stated that it has been a disappointment thus far, with hopes for improvement.

Another problem that has plagued Ice Patrol for many years is the inability to identify radar targets during marginal or poor visibility. Many flights must be made in marginal weather and some with poor visibility. Flight tracks of the Ice Patrol flights are usually spaced 25 miles apart, which is a compromise between maximum area coverage and maximum probability of detection. Thus a visibility of at least 12½ miles is required to obtain 100 percent visual effectiveness. Often this visibility is not obtained (see table 2), with reliance shifted to radar. The altitudes flown by Ice Patrol aircraft vary from 500 to 2,000 feet, and from these altitudes even the smaller bergs can usually be picked up by radar up to 15 miles. Radar targets can then be identified by diverting from the planned track unless the ceiling is below 500 feet. With ceilings frequently below 500 feet, the inability to identify a radar target as a fishing trawler or an iceberg becomes a serious handicap. International Ice Patrol has tested a few detection-type instruments in flight with some success; however, the tests were not deemed sufficiently promising due to excessive costs of purchase and installation. One such instrument called the bolometer was tested in 1954, but could not detect ice in fog. It is planned to install airborne radiation thermometers, which are the successor to the bolometer, aboard Ice Patrol aircraft for the 1964 ice season for use in recording the surface sea temperatures along the track to enable location of the Labrador and Atlantic Currents and branches. The use of this instrument is expected to assist in berg drift and deterioration forecasting and in flight planning. Further research has been conducted on instruments tested by the Ice Patrol, and when the promise of success justifies the effort and expense, the equipment will be purchased and installed with the objective of improving the efficiency of the International Ice Patrol and providing the best possible services at the lowest costs.

Five observation flights were made from 13 January to 27 February by the Air Detachment to determine the southern limit of ice and to enable deciding when to commence the International Ice Patrol. Two of these flights were made in a survey north along the Labrador coast to Baffin Island and return for the main purpose of determining the 1963 iceberg potential. Five observation flights were made by

the Air Detachment after the termination date of International Ice Patrol to 23 July for the main purpose of detecting the movement of any stray berg onto the Grand Banks after the conclusion of the ice season.

Table 2. Aerial Ice Reconnaissance Statistics—1963 Season

Month	Number of flights	Number days flights made	Number days good visibility [1]	Average effectiveness percent		Maximum number days between flights	Hours flown
				Visual	Radar		
Mar. (6–31)	7	7	12	60	63	7	45.2
April	8	7	8	57	69	7	58.2
May	7	6	14	88	68	10	45.6
June (1–18)	2	2	5	85	70	11	14.5
Total/average	24	22	39	72.5	65		163.5

[1] Days on which an estimated 50 percent of flight area can be searched visually with 25-mile track spacing.

COMMUNICATIONS

Twice-daily ice broadcasts were made to shipping by International Ice Patrol radio station (NIK), Argentia, Newfoundland, at 0048 and 1248 Greenwich mean time simultaneously on 155, 5320, and 8502 kcs., commencing 7 March and terminating 21 June. Following successful test transmissions in 1962, ice charts were broadcast by facsimile as a regular daily service at 1330 Greenwich mean time on 5320 and 8502 kcs. Indications are that several ships with facsimile receivers successfully copied the Ice Patrol charts with coverage as far as the U.S. coast and 1,200 miles eastward. All transatlantic ships are encouraged to install facsimile transceivers. The ice information received by facsimile is more reliable than by CW, as human transmission and reception errors are eliminated and considerably more information can be transmitted by facsimile in a given amount of time. Also twice-daily ice bulletins were transmitted at 0030 and 1230 Greenwich mean time via teletype to U.S. Naval Oceanographic Office, Washington, D.C., Canadian Department of Transport Ice Forecast Central, Halifax, and others for further dissemination. At the request of the U.S. Naval Oceanographic Office, the precedence of the ice bulletins was increased from priority to operational immediate to insure reception in time for the U.S. Navy Radio Washington (NSS) 0430 and 1630 daily ice broadcasts.

Ice Patrol radio station (NIK) worked merchant vessels on 427, 6477.5, 8734, and 12718.5 kcs. Ship reports of ice and weather in the Grand Banks area were an indispensable source of ice information and oceanographic and meteorological data which assisted International Ice Patrol in determining ice conditions and disseminating pertinent ice information to shipping. Annually after termination of the International Ice Patrol and until commencement the following

year, ships are requested to transmit ice reports to the U.S. Naval Oceanographic Office, Washington, D.C., for further dissemination. U.S. Coast Guard radio station (NJN), Argentia, will be available for relay of ice reports and also for transmission of safety broadcasts when unseasonable ice threatens shipping lanes near the Grand Banks. A permanent nucleus of the International Ice Patrol Office will maintain a plot of ice reports on the Grand Banks and vicinity year round and will answer ship requests for ice information via NJN during the offseason.

During the 1963 season, ice patrol communications facilities handled a total of 10,791 radio messages and 18,559 landline messages. Statistics on ship reports are as follows:

Number of ice reports received from vessels	251
Number of vessels furnishing ice reports	129
Number of weather reports received from vessels	4633
Number of vessels furnishing weather reports	342
Number of requests for special ice information	66
Total number of vessels worked (not including relays)	387

The percentage distribution of reporting vessels by nationality is as follows:

Country	Number of reporting ships	Percentage of total	Country	Number of reporting ships	Percentage of total
United Kingdom	92	25.5	Israel	3	.8
United States	72	20.0	Switzerland	3	.8
Germany	49	13.6	Belgium	2	.6
Norway	39	10.8	Canada	2	.6
Netherlands	23	6.4	India	2	.6
Sweden	20	5.6	Japan	2	.6
Liberia	14	3.9	Yugoslavia	2	.6
France	7	2.0	Iceland	1	.3
Denmark	5	1.4	Lebanon	1	.3
Italy	5	1.4	Poland	1	.3
Panama	5	1.4	Spain	1	.3
Greece	4	1.1			
Ireland	4	1.1	24 nations	361	100.0

ICE CONDITIONS 1963

JANUARY

Although most of the United States and Europe were experiencing a severely cold early winter, Newfoundland and Labrador and surrounding waters were having slightly above normal temperatures after a mild autumn. The sea ice off the east coast of Labrador and in the Gulf of St. Lawrence was accordingly slow in forming. A special iceberg survey flight made on 13–14 January along the Labrador coast to Baffin Island determined the limits of ice south to Belle Isle and east to 55° W. Although still open at this time, Belle Isle Strait was declared closed to navigation on the 15th by the Canadian Department of Transport. North of 55° N. the sea ice generally extended to about 100 miles offshore. Although the sea ice limits were about average, it is estimated that the ice thickness was well

below normal, with considerable young and slush ice and no thick winter ice observed south of Cape Chidley. Three small bergs were observed near Belle Isle, and very surprisingly only 23 bergs were counted south of Hudson Strait. By the end of the month the sea ice limits had advanced 60 miles to the southeast and east of Belle Isle. The average wind during the month along the Labrador coast was light SE and unfavorable for transport of ice to the south.

FEBRUARY

With average west-northwesterly surface winds and colder air temperatures, the limits of sea ice approached the Grand Banks from Belle Isle at an average of 6 miles per day. By the end of February the sea ice had reached the northern Grand Banks near Cape Bonavista, extending northeast from there to the 1,000-fathom curve then north-northwestward along the 1,000-fathom curve. Though the sea ice limits were rather extensive, the average thickness of the ice was estimated below normal as the average offshore winds prevented growth of the already-formed ice. There were no bergs reported during the month and none believed below 50° N. The first ship report of ice during the year was received from the U.S. Coast Guard cutter *Yakutat*, who reported the eastern limits of slush ice near 52° N., 49°30′ W., on 17 February.

With average cold northwest winds over the Gulf of St. Lawrence, most of the gulf was covered with young ice by midmonth with the exception of the steamer track from Cape Ray north of Anticosti Island to the St. Lawrence River. By the end of the month, the ice limits had advanced to 50 miles southeast of Scatari Island with the limits north to Burgeo Bank and then westward just south of Cape Ray. With assistance of icebreakers, all the major gulf and Newfoundland ports were kept open throughout by the Canadian Department of Transport.

MARCH

During the first week in March, the entire area from the Grand Banks northward along the Newfoundland and Labrador coasts was dominated by a cold polar air mass with strong northwest winds and attendant very cold air temperatures averaging about 15°–20° F. Accordingly, the sea ice limits rapidly advanced onto the northern Grand Banks south to 47° and east to 48° W. accompanied by growth in the thickness of the sea ice. St. Johns Harbor and approaches from the southeast remained open water throughout the month. Trinity and Conception Bays were open water for the most part. The above limits of sea ice remained remarkably constant until the end of the month, as the deterioration of the ice by warmer waters at the southern and eastern limits matched the supply fed by the Labrador Current and average west-northwest winds.

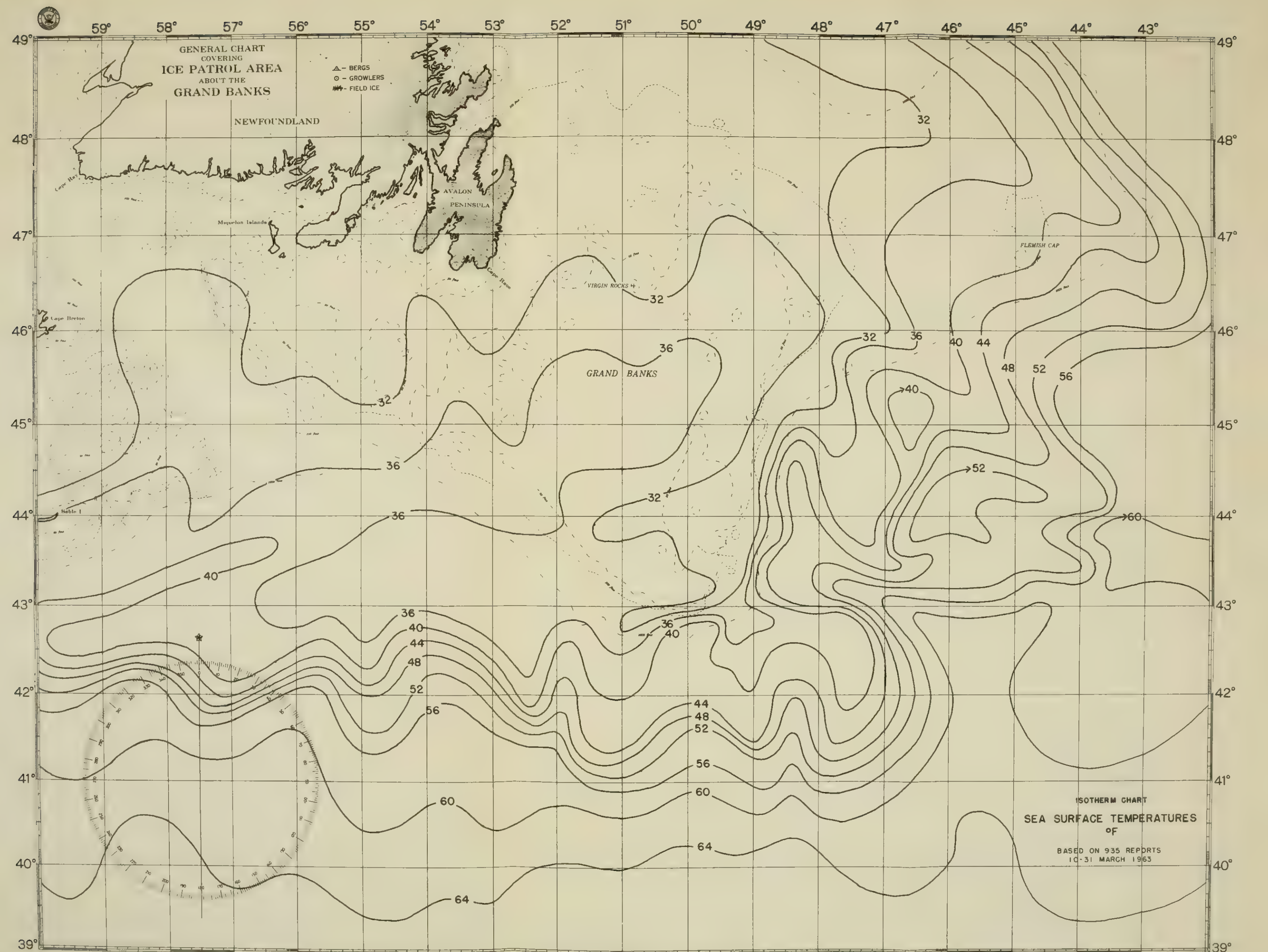

FIGURE 1.—Surface isotherms for period 6–31 March 1963.

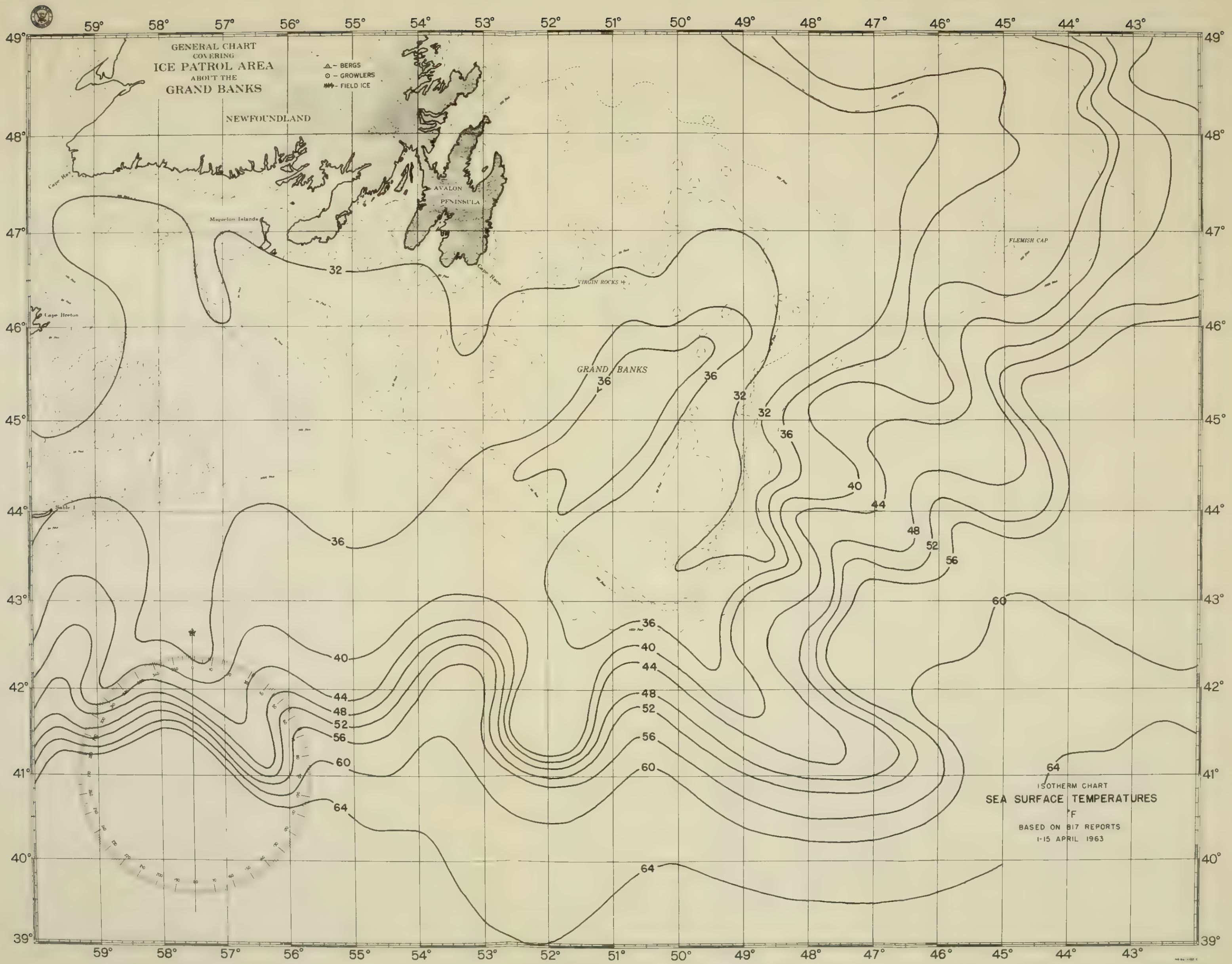

FIGURE 2.—Surface isotherms for period 1–15 April 1963.

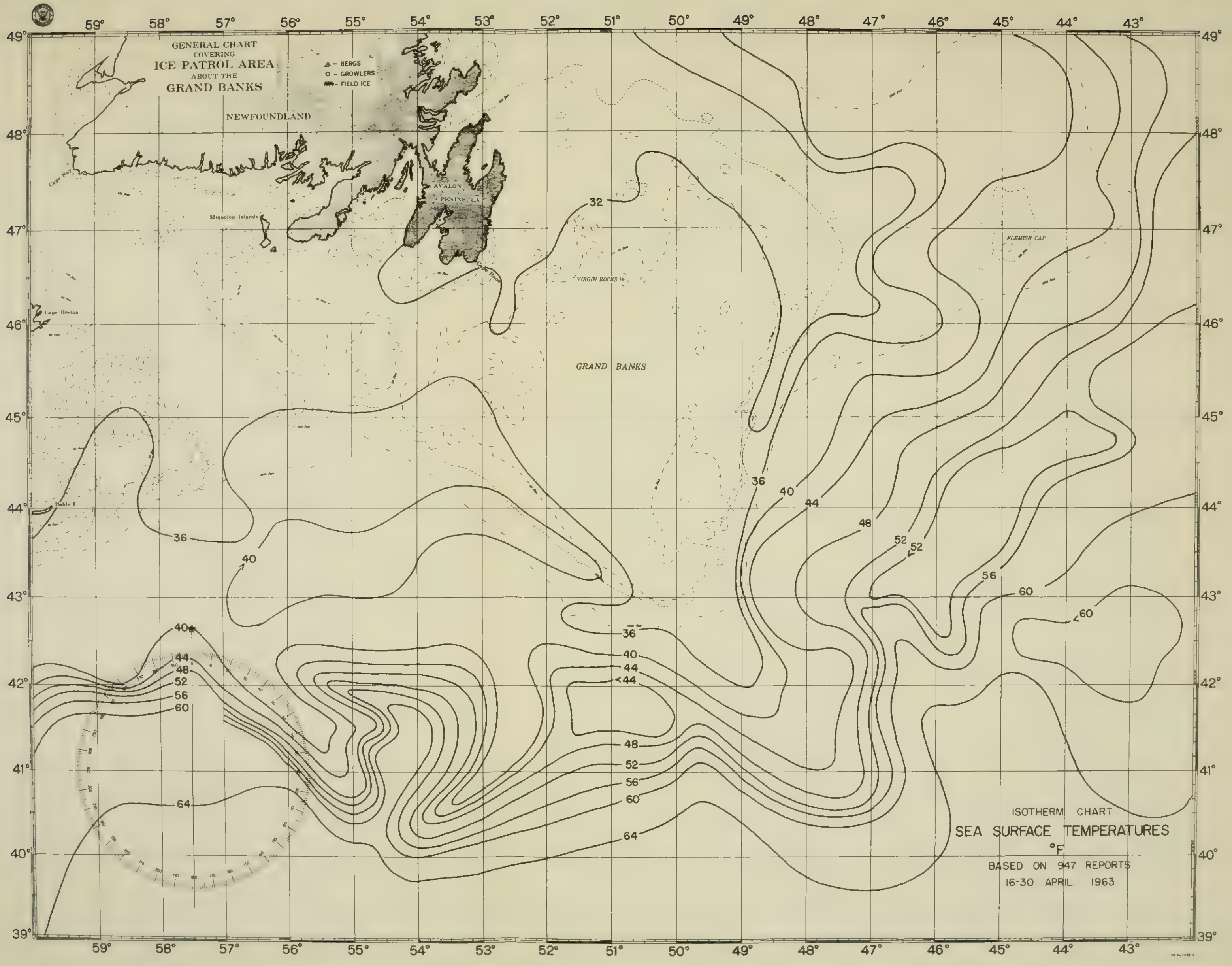

FIGURE 3.—Surface isotherms for period 16–30 April 1963.

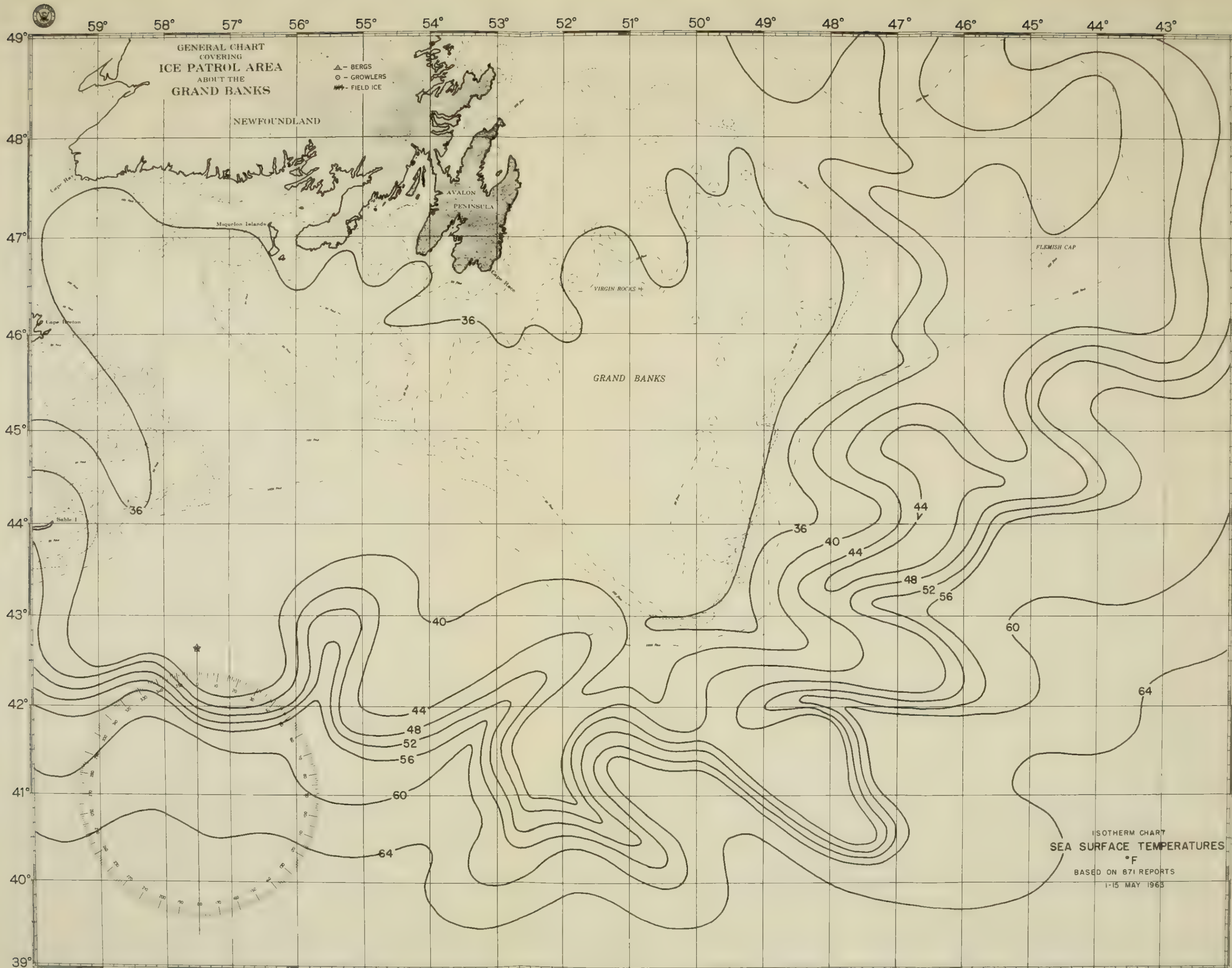

FIGURE 4.—Surface isotherms for period 1–15 May 1963.

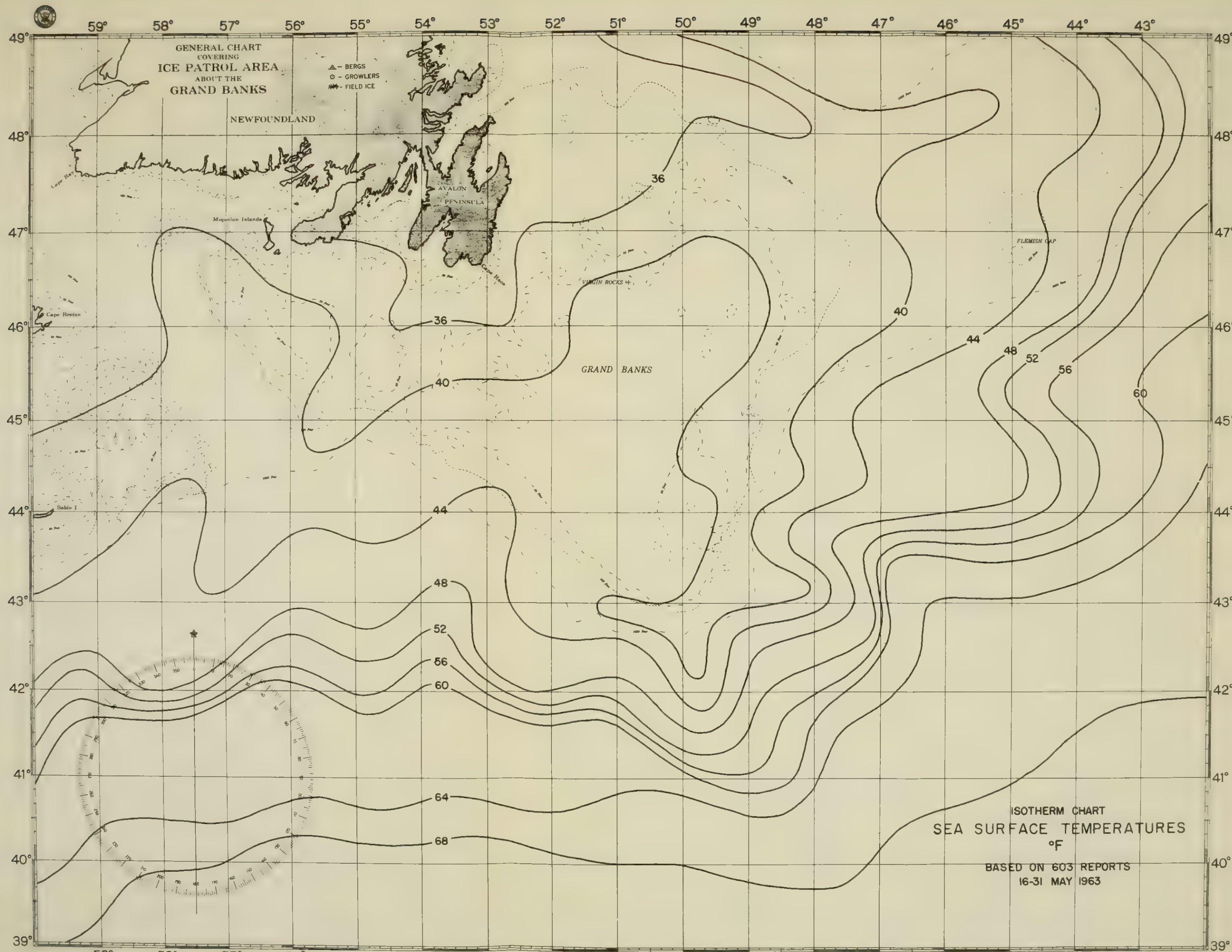

FIGURE 5.—Surface isotherms for period 16–31 May 1963.

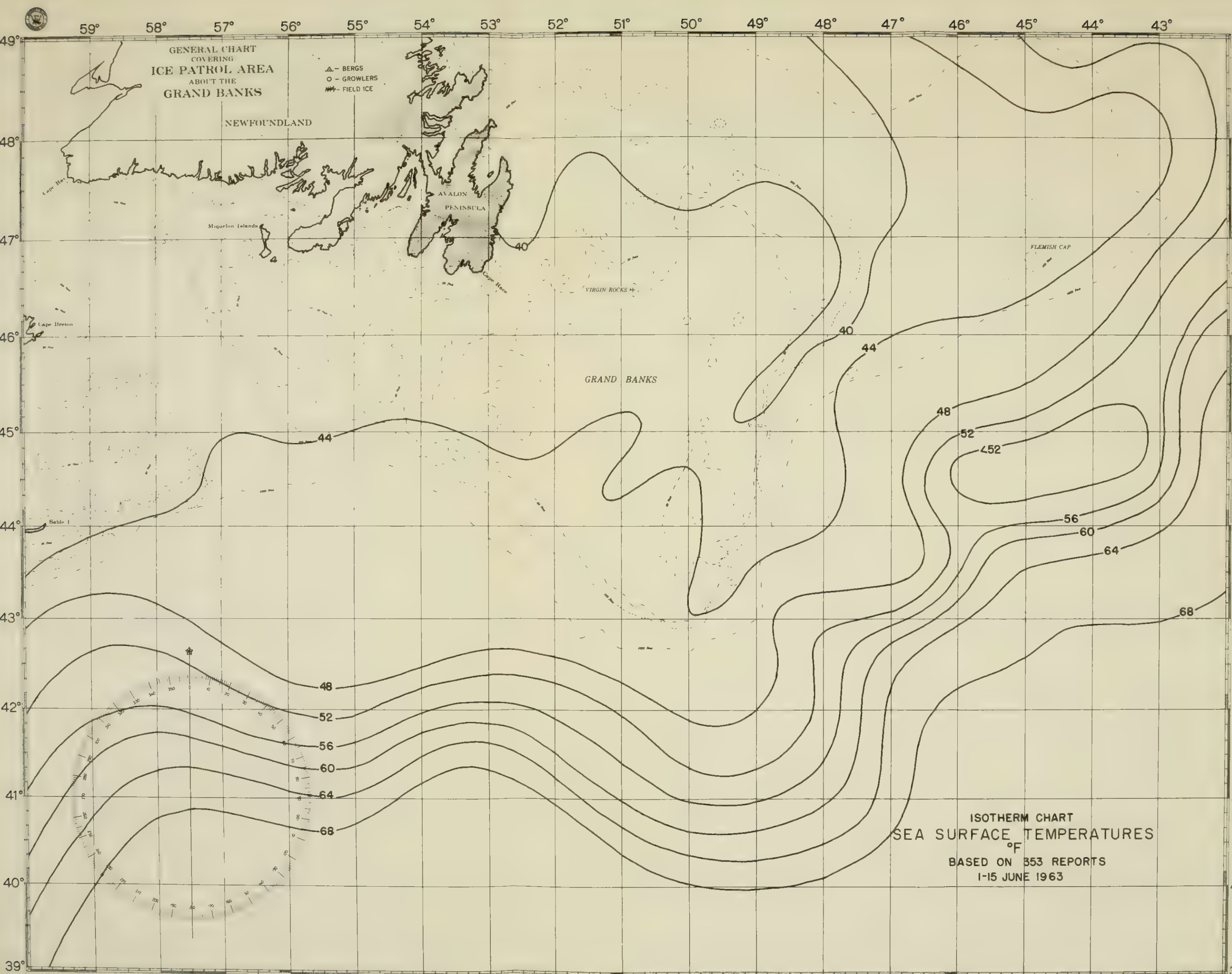

FIGURE 6.—Surface isotherms for period 1–15 June 1963.

The first berg in the vicinity of the Grand Banks for the year was reported on the 10th at 48°28′ N. and 48°35′ W. as a small berg by the U.S. Coast Guard cutter *Spencer.* A couple of days later a Canadian Department of Transport aerial reconnaissance flight reported two bergs near 49° N., 51° W. The few bergs observed off the Labrador coast in mid-January were now beginning to arrive at the northern Grand Banks in the Labrador Current under favorable meteorological conditions. A second northern iceberg survey flight along the coast of Labrador to Baffin Island in mid-March confirmed a very light iceberg year, as only 119 bergs were counted south of Hudson Strait with an estimated total of 140 bergs. On 23 March, 11 bergs were located on the northern Grand Banks with all but one between 47°40′ N. and 49° N. west of 50° W. The exception was a small weathered pinnacle berg at 47°08′ N., 47°28′ W. Except for one large berg at 48°40′ N., 52°20′ N., and one medium-sized berg, the bergs were all badly weathered and small, of the drydock pinnacled variety, with only a few day's survival remaining. Three of the bergs were located south of 48° N. at this time. A flight on the 30th revealed that the southernmost berg had deteriorated and the movement of bergs west of 50° W. on the 23d was easterly at an average of 20 miles per day. The large berg was located at 48°10′ N., 50°20′ W., apparently aground in about 90 fathoms of water. An additional 15 bergs had arrived on the northwestern Grand Banks east of Cape Bonavista. These bergs were estimated to have traveled about 18 miles per day during

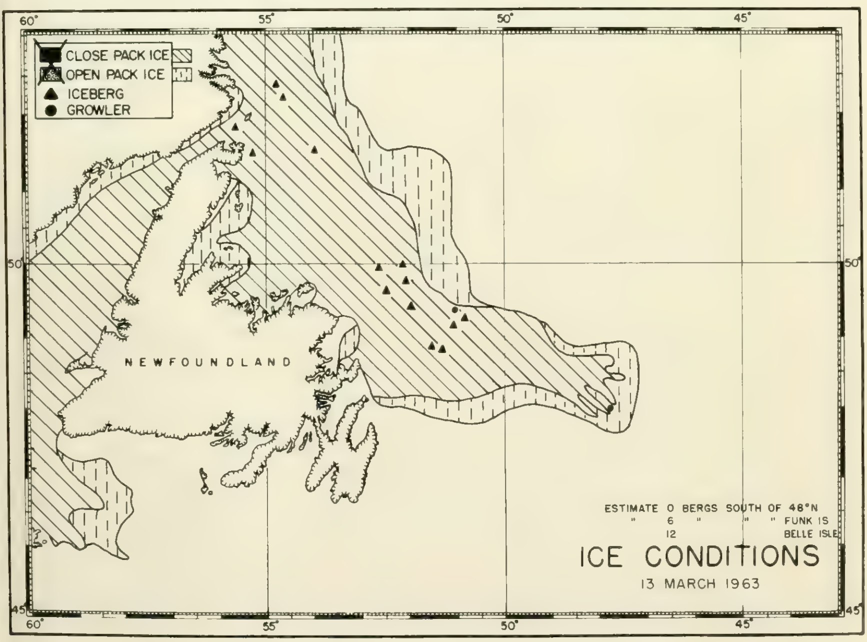

FIGURE 7.—Ice conditions on 13 March 1963.

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the past 17 days. It is estimated that four bergs drifted south of 48° N. during March, considerably below the average number.

The Gulf of St. Lawrence was almost entirely covered with winter ice by mid-March, but the constant discharge of considerable ice through southern Cabot Strait, due to average west-northwesterly winds, kept the ice thickness down. By the end of March there was considerable open water from the shores of Quebec south to 48°30′ N., west into the river and northeast into the arm. However, the southern gulf and western Newfoundland coasts were experiencing difficult ice conditions due to heavy ridging and compacting of ice from the west-northwesterly winds. The southern limits of the sea ice discharging from Cabot Strait remained fairly constant near 45° N., with eastern limits generally between 57° W. and 58° W., and the maximum combined limits existing near the end of the month. The Canadian Department of Transport reported that all major gulf and Newfoundland ports continued to remain open throughout, with some assistance from icebreakers required. The shipping track from Cape Ray into the St. Lawrence River was reported navigable by 29 March. For existing ice conditions on 13 March and the plot of ice sighted and reported for March, see figures 7 and 14.

APRIL

The weather pattern of cold strong west-northwesterly flow over the northern Grand Banks and coastal waters to the north prevailed into the first week of April. The March isotherm chart indicated colder-than-normal sea surface temperatures. See figure 1. However, flights on the 2d and 3d indicated that the few bergs moving east-southeast along the northeast slope of the Grand Banks were rapidly deteriorating, mainly because of their small size, shape, and the rough sea conditions. At this time there were only four bergs, all small, south of 48° N., and only three bergs east of 49° W. There were seven bergs between 49° W. and 51° W. along 48° N., and about 17 bergs, mostly small, between 48°30′ N., 49°20′ N., and 50°40′ W., 52°30′ W. Of these 30-or-so bergs, one was large, six were medium sized, and the remainder small. For ice conditions on 3 April, see figure 8. Although the sea ice extended east to 47° W. on this date, the southern limits on the Grand Banks had receded to 47°30′ N., consisting of a belt of open pack ice 60 miles in width at 50° W. tapering to 20 miles at 47° W.

The spell of strong northwesterly flow over the Grand Banks was finally broken on the 5th, with the cyclonic track displaced farther south than usual across the southern Grand Banks. On this date the M/V *Willowpool* reported two bergs both just south of 47°, with one located at 46°48′ N., 45°29′ W. This was to be the easternmost berg reported in the Grand Banks area for the year. For the first time this year a berg had drifted south of 47° N. With the change in weather

pattern, winds over the southeast limits of ice were variable and strong. North of the Grand Banks and along the Labrador coast the surface winds were consistently east-northeasterly. Although the four bergs sighted south of 48° N. on the 3d all deteriorated before they reached 46° N., one large berg and a handful of medium-sized bergs were to be watched. Two very successful flights made on the 17th covered all areas of suspected ice on the Grand Banks and also the area north of the Grand Banks to 50°30′ N. These flights enabled a determination of ice conditions on the Grand Banks and the potential for the next month. See figure 9. There were no bergs south of 48° N. at this time, but a growler was sighted at 47°05′ N., 47°40′ W. There were only 10 offshore bergs and an estimated 20 bergs aground or trapped in bays south of Belle Isle. The large berg was located at 48°05′ N., 47°10′ W.; three bergs were near 48°20′ N., 50°10′ W.; and four bergs near 49° N., 51° W. These eight bergs were the only ones remaining that were in a good position to drift toward the major transatlantic shipping lanes at the Tail of the Banks. The April surface sea water temperatures on the Grand Banks as shown by figures 2 and 3 were colder than normal, and the large pinnacled berg, measured by the U.S. Coast Guard cutter *Ingham* on the 17th as 450 feet long and 190 feet high, was expected to last at least a month if it remained in the cold waters of the Grand Banks or Labrador Current. This berg was given a good chance to reach Track C, but the other six medium-sized and one small berg were not expected

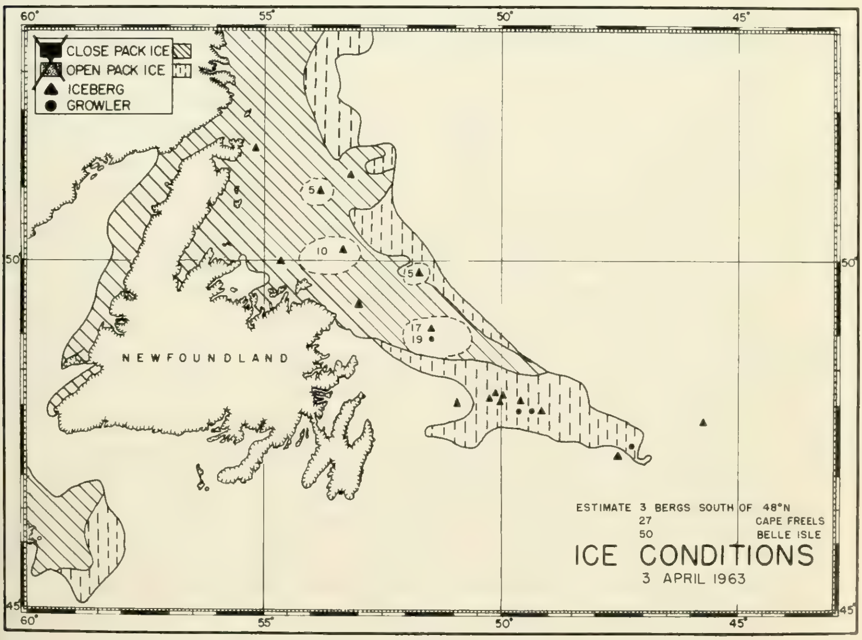

FIGURE 8.—Ice conditions on 3 April 1963.

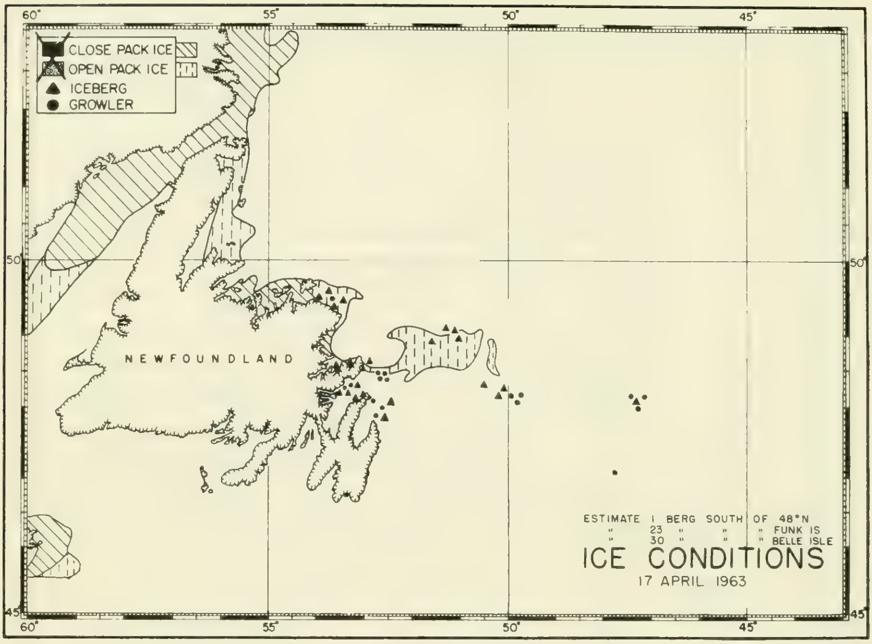

FIGURE 9.—Ice conditions on 17 April 1963.

to last the time required to travel the 450–500-mile trip. It was now obvious that the one large berg represented the only threat to track C and B, at least until June. This berg moved rapidly south in the Labrador Current for the next few days, grounding in 60 fathoms of water near 46° N., 48° W., on the 21st. It apparently broke up into four small bergs which were sighted on the 25th near 45°25′ N., 47°45′ W. The current chart of the area from the first oceanographic survey completed in mid-April showed that these bergs were now in an eddy between the Labrador and Atlantic Currents. A flight at the end of the month revealed negligible southern movement of the latter four bergs. The remainder of the offshore bergs had been driven onto the northeast Grand Banks, with a couple aground along Avalon Peninsula. Now it was simply a matter of time until the remaining seven small bergs deteriorated, leaving the entire Grand Banks ice free. The pattern for the 1963 ice season was established. An estimated 20 bergs drifted south of 48° N. during the month.

With strong variable winds and attendant heavy seas, the sea ice along the north and northeast slope of the Grand Banks rapidly disintegrated. By 17 April the limits had receded to west of 50° W., with only a 40- by 70-mile area of very open pack ice remaining east of Cape Bonavista. To the northward as far as 54° N., under the influence of consistent east-northeast winds, the limits of sea ice had retreated to within 30 miles of the coast. By the next week no sea

ice remained south of Cape Bonavista and by the end of the month there was none south of Cape Freels.

During April the sea ice in the gulf gradually melted with limits shrinking, so that by the end of the month the entire central gulf was ice free with remnants of sea ice between Prince Edward Island and Cape Breton Island, the usual heavy winter ice in the Northeast Arm and Belle Isle Strait, and an area of open pack ice close along the northeast and southeast coasts of Cape Breton Island. The St. Lawrence Seaway opened on schedule on the 15th. For the plot of ice sighted and reported during April, see figure 15.

MAY

Flights made on 30 April and 1 May searched all areas of suspected ice north to Belle Isle Strait. There were only 19 bergs south of Belle Isle, with 7 of these offshore, all south of 48° N., 5 aground on the east coast of Avalon Peninsula, 5 aground near Cape Bonavista, and 2 near Fogo Island. See figure 10 for ice conditions on 1 May. Of the seven offshore bergs, five were small with an estimated survival of less than 10 days and two were medium sized with an expected survival of less than 15 days in the average 35°–36° F. water. A flight on the 11th along the north and northeast slopes of the Grand Banks and along the east coast of Newfoundland revealed only one small offshore berg remaining at 47°25′ N., 48°15′ W. This berg was last reported as a growler on the 15th, 30 miles to the southeast, and is believed to have disintegrated shortly thereafter. Three bergs remained on the east coast of Avalon Peninsula. These bergs in the colder 32°–33° F. water were able to last longer than the offshore bergs and were expected to deteriorate by the end of the month.

With the disintegration of the lone offshore berg in mid-May, the threat of ice to the Grand Banks no longer existed, at least until the second week of June. It was now highly unlikely that major trans-atlantic shipping would be threatened by bergs this year. The threat to those ships using the more northern tracks E and F would have to come from bergs near Belle Isle or northward.

As stated previously, the April surface winds north of the Grand Banks along the Newfoundland and Labrador coasts were consistently easterly throughout the month, driving all the bergs aground in these regions, temporarily delaying their transport to the south. This weather pattern abruptly changed in early May as a northward shift of the Azores High brought warm southwesterly winds across the Grand Banks, Newfoundland, and south Labrador until the end of May. As expected, the many bergs suspected aground north of Belle Isle were freed to continue their interrupted journey south. On 10 May, Belle Isle reported 26 large bergs to the north and east. A flight on 14 May to Belle Isle revealed about 45 bergs near Belle Isle. The sea ice which had been compacted close along the northeast New-

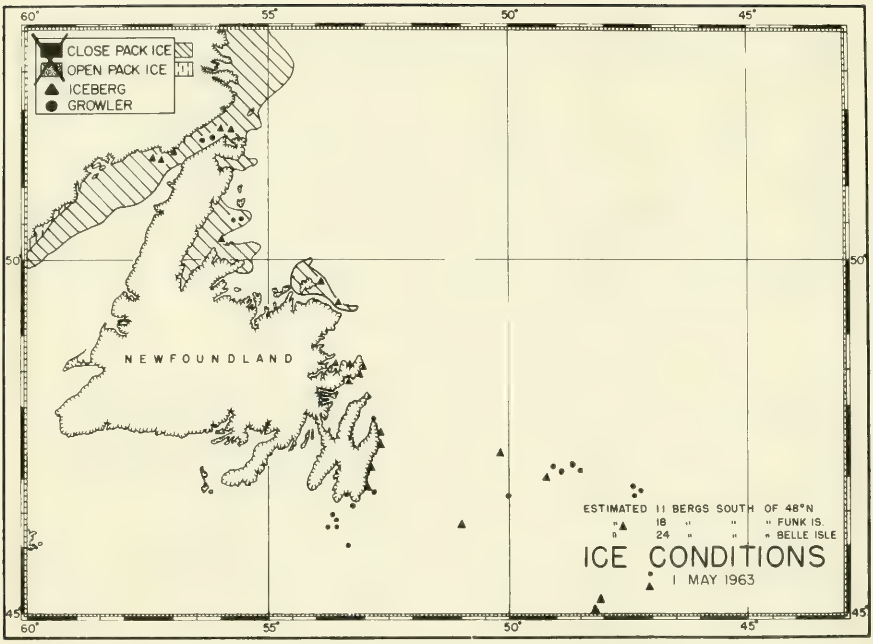

FIGURE 10.—Ice conditions on 1 May 1963.

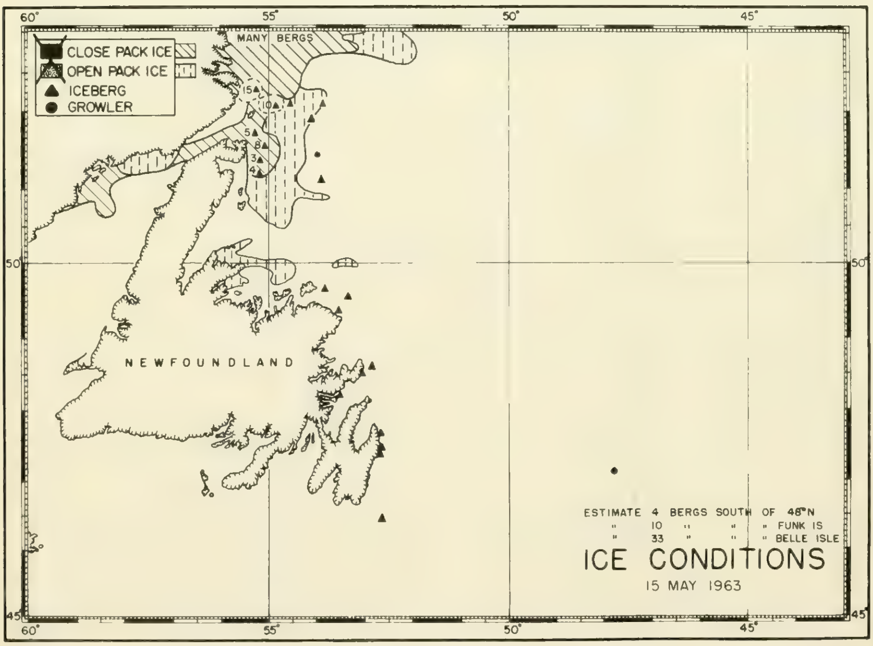

FIGURE 11.—Ice conditions on 15 May 1963.

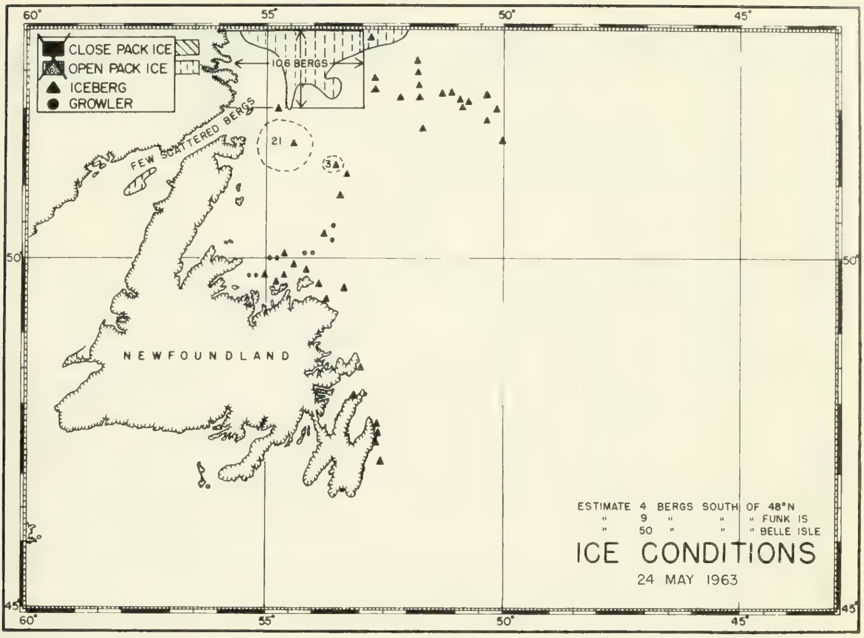

FIGURE 12.—Ice conditions on 24 May 1963.

foundland and east Labrador coasts had spread out to about 70 miles offshore.

Two flights on the 24th relocated the remaining bergs, all aground along the east coast of Newfoundland, and covered the northern area as far north as 55° N. and east of Belle Isle to 50° W. Only six bergs remained south of Cape Freels. There was negligible southward movement of the many bergs sighted 10 days previously near Belle Isle. Instead, under the influence of the predominant southwest winds, these bergs had drifted easterly. There were a total of about 150 bergs between 51°30′ N., 53° N., from the coast to 50° W. There were another 140 bergs from 53° N. to 55° N. Belle Isle Strait and approaches from the east were free of sea ice with southern limits along 52° N. and eastern limits of 52°30′ W. and open pack south of 54° N. See figure 12 for ice conditions on 24 May.

Abnormal air temperatures in May caused a sharp rise in the surface sea temperature from a below-normal to an above-normal condition. See figures 4 and 5 for the May semimonthly isotherm charts. The existing ice conditions at the end of May combined with the tendency of eastward berg drift off Belle Isle Strait out of the Labrador Current and the above-normal sea temperatures greatly reduced the likelihood of any threat to track C or a major threat to the northern Grand Banks. No known bergs drifted south of 48° N. during May. It is believed that only one other May, that of 1952, also was unique with

no bergs crossing 48° N. By 7 May, with the exception of the Northeast Arm and Belle Isle Strait, the gulf was ice free. The Ice Information Officer of the Department of Transport, Sydney, Nova Scotia, terminated ice operations in the gulf for the year on 11 May. By 18 May, Belle Isle Strait was navigable and it was ice free, by the 23d, or about 1 month ahead of schedule.

JUNE

A flight on the 2d indicated only 4 bergs south of 51° N., with all four aground on the east coast of Newfoundland. Only one berg remained south of 48° N. This small berg aground near Cape Broyle is estimated to have deteriorated by 4 June. Only one other berg was to drift south of 48° N., for the remainder of the year. Three small bergs had drifted about 90 miles southeast of Belle Isle, and there were 13 bergs along the 1,000-fathom curve between 51°–52° N. However, deterioration, especially in the warmer eastern waters had been very heavy. Only two of the bergs sighted on the 2d were large enough and in position to reach track E and only an additional handful were considered capable of reaching track F.

The weather pattern abruptly changed in early June with a system of stationary lows east of Newfoundland being fed cold air from a tremendous stationary high over the Canadian Northwest Territory. This accelerated the southerly drift of the many scattered bergs between Belle Isle and 50° W. A flight on the 13th demonstrated the effect of the average northerly winds over the southern ice limits during the past 2 weeks. There were two distinct berg groupings; one of 18 bergs, mostly smaller sized, centered near 50°20′ N., 50° W., and the other of 22 bergs, mostly medium, near 50°35′ N., 53°50′ W. These bergs had drifted an average of 10 miles per day since 2 June. The southernmost offshore berg was a medium drydock berg at 49°35′ N., 49°10′ W. There was a very large tabular berg in the second group, estimated to be 1,200 feet long and 50 feet high. See figure 13 for ice conditions on 13 June.

For the next few days the winds were variable over the southeast berg limits and averaged north-northeasterly near Notre Dame Bay. As a result a flight on the 19th indicated that the current had dominated the drift of the first group, while the second group was mostly driven aground into Notre Dame Bay, where deterioration was rapid in the warmed coastal waters. Four medium-sized bergs near 49° N., 49° W., remained a minor threat to the northern Grand Banks. Two of these bergs were last sighted in early July about 20 miles and 100 miles eastward, respectively. One berg apparently drifted southward in the Labrador Current unseen for 30 days until reported by the SS *Evie* on 19 July as a growler at 43°18′ N., 46°02′ W., in 72° F. water. It is difficult to lend credence to this report as the southernmost berg sighted on 19 June at 48°35′ N., 49°12′ W., was medium sized and

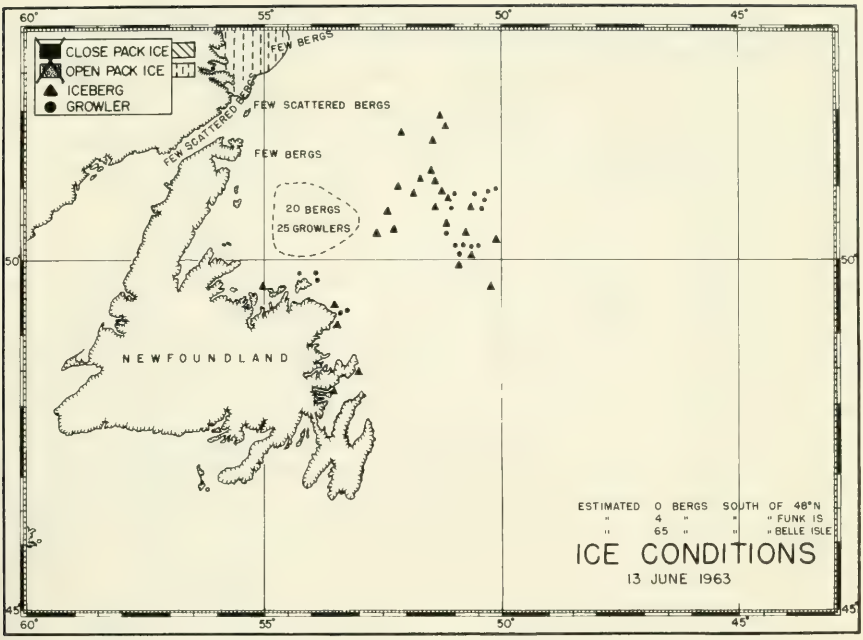

FIGURE 13.—Ice conditions on 13 June 1963.

expected to last less than 2 weeks in the average 38°–40° F. water. Bergs in their journey south along the east slope of the Grand Banks are usually sighted and reported by several different ships. This one, except for SS *Evie*, was not reported once. Average surface winds over the Grand Banks during the interval were southwest and unfavorable for south transport of bergs. Nevertheless, the ice report was verified and must be recorded as such.

It is estimated that 1 berg drifted south of 48° N. during June, making a total of 25 bergs for the year, or considerably below the average of 392 since 1900. For the plot of ice sighted and reported for June, see figure 17.

JULY

An ice observation flight on 2 July indicated only six bergs south of 50° N. with the southernmost a medium tabular berg at 48°52′ N., 48°45′ W., and the easternmost a small dome berg at 49° N., 46°47′ W. By 12 July only two of the six bergs remained, the medium tabular now a small tabular, 25 miles to the northwest of its sighted position 10 days before, and a small tabular berg near Fogo Island. The latter berg was the remains of the very large tabular berg sighted a month ago 60 miles to the northwest. On the 14th the U.S. Coast Guard cutter *Evergreen* reported two growlers 5 miles to the east of the sighted position of the single offshore berg on the 12th.

The next flight on the 23d, covering the areas north of the Grand Banks to 52° N. from the coast to the 1,000-fathom curve, revealed

only three small bergs south of Belle Isle, all close ashore, with the southernmost a small dome berg at 50°20′ N., 54°45′ W. The fact that just a couple of days before a growler was reported 650 miles to the southeast in the warm Atlantic Current is further baffling, for the several larger bergs in colder waters farther north had long since disintegrated. By the end of July it is estimated that there were no bergs south of 51° N.

AUGUST

August as well as July was notable for the almost complete absence of berg reports in Belle Isle Strait and approaches. Ordinarily the approaches to Belle Isle Strait are infested with bergs during the Grand Banks ice season and through the middle of September, with occasional bergs in October. The probable reason for this lack of bergs is the fact that there was greater deterioration of the crop in the late summer and early autumn of 1962 due to above normal temperatures along Baffin Island, with less bergs and smaller sizes available for the late season. Another possibility is the fact that the average surface winds along the entire Labrador coast in June were on shore, with the likelihood that the majority of bergs were driven into bays or aground and prevented from moving farther south. During the summer months the immediate coastal waters along Labrador undergo considerable warming and become warmer than the offshore waters of the Labrador Current. It is noted that in July and August the average surface winds along the Labrador coast were southeast, further impeding any southern movement of bergs.

The only report of ice during August was a growler and three bergs near Belle Isle on the 3d. It is estimated that these bergs deteriorated within a few days, leaving no ice south of 53° N. for the remainder of the month.

SEPTEMBER–DECEMBER

For the remainder of the year, only a few bergs are believed to have managed to reach Belle Isle Strait or the eastern approaches, doing so during the period from late September through early November. None are believed to have drifted south of 51° N. Three special ice observation flights were made 3–5 December for the main purpose of making a northern iceberg survey in order to determine the Grand Banks berg potential for 1964. These flights covered waters of probable location of bergs from Cape Bonavista, Newfoundland, to Cape Dyer, Baffin Island. A total of 532 bergs were counted in these areas, with the southernmost at Belle Isle and the first noticeable concentration near 57°30′ N., about 215 miles south-southeast of Cape Chidley, Labrador. As a result of special preseason iceberg surveys made in January and March 1963, combined with iceberg counts made by the Canadian Department of Transport in the fall of 1961 and 1962, and berg data accumulated by the Ice Patrol over the years, certain

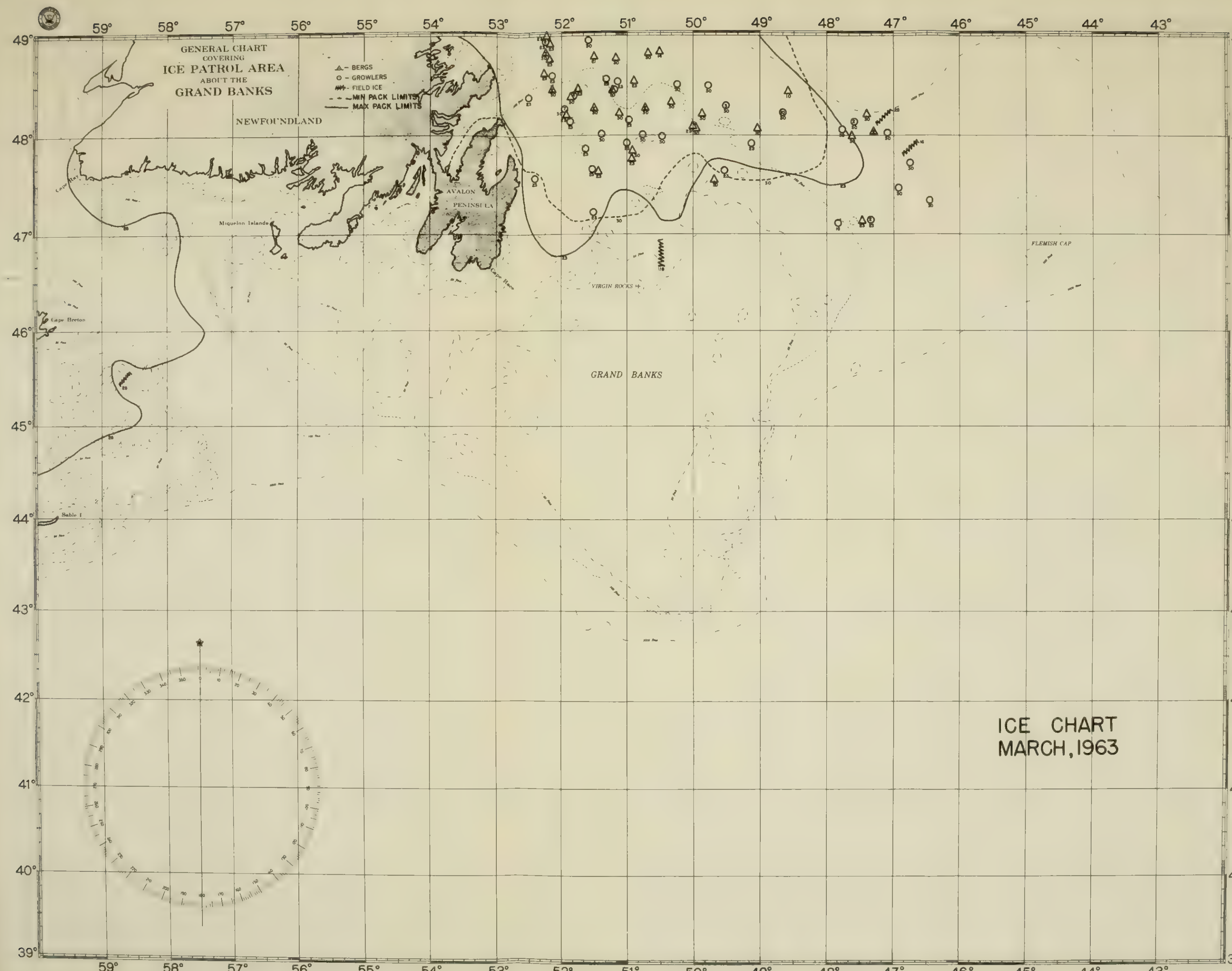

FIGURE 14.—Ice chart, March 1963. Figures indicate day of month ice was sighted or reported.

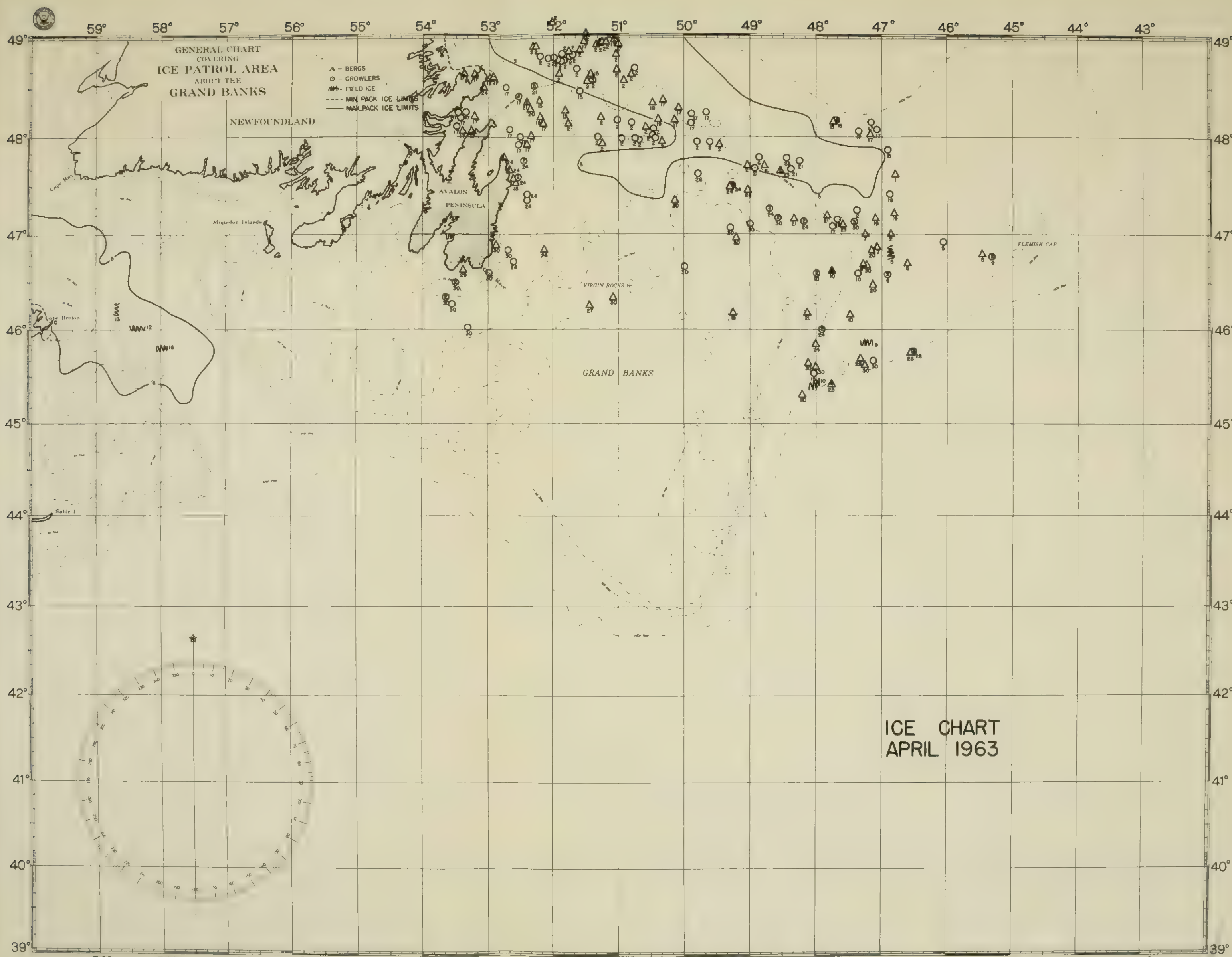

FIGURE 15.—Ice chart, April 1963. Figures indicate day of month ice was sighted or reported.

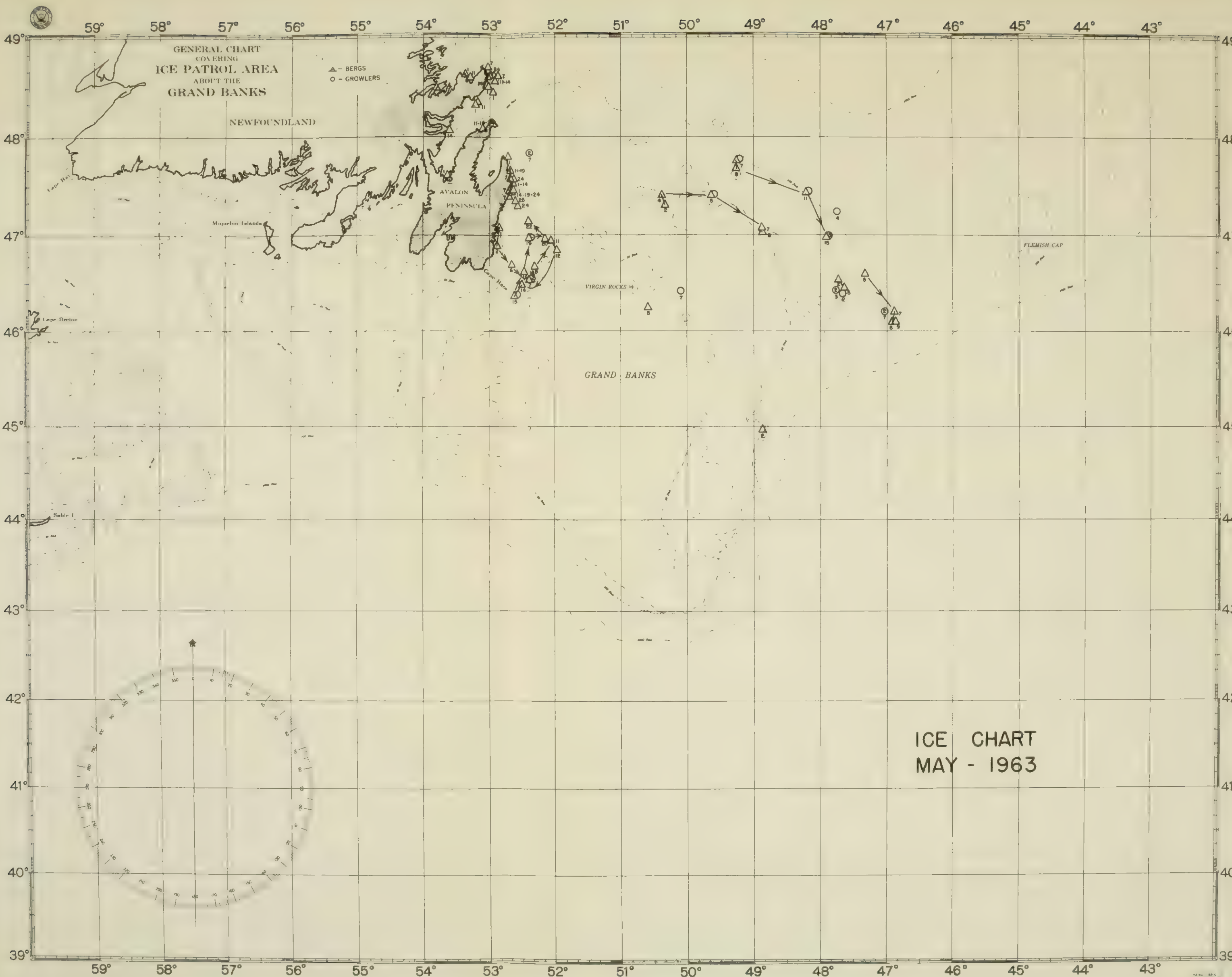

FIGURE 16.—Ice chart, May 1963. Figures indicate day of month ice was sight or reported.

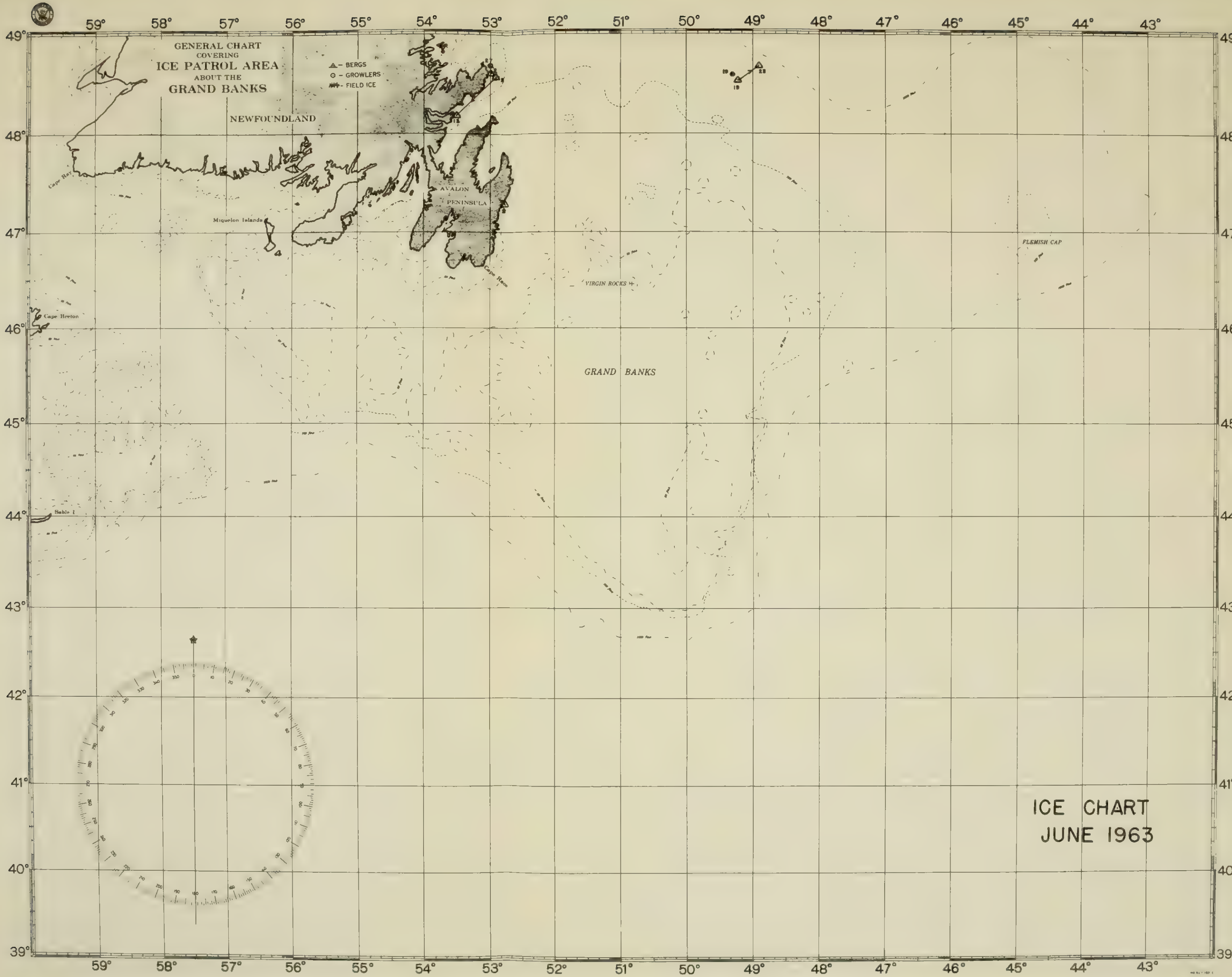

FIGURE 17.—Ice chart, June 1963. Figures indicate day of month ice was sighted or reported.

determinations and conclusions of berg characteristics were made. (For a full discussion of these surveys, see another section of this bulletin.) The average drift rate of bergs along the Labrador coast in the winter and spring of 1962 and 1963 was about 7.5 miles per day. Using an average drift rate of 7.5 miles per day along the Labrador coast and somewhat less along the Baffin Island coast, it can be concluded that bergs north of Cape Dyer in early December are ordinarily unable to reach the Grand Banks prior to late June or July and most likely will not survive the trip. One of the conclusions was that assuming average meteorological and oceanographic conditions, bergs must drift south past Cape Chidley from early November through February in order to have much chance of making it to the Grand Banks prior to deterioration. The location of the first concentration of bergs appears to support this conclusion. Since the total of 532 bergs counted is less than the estimated 900 bergs in this region in early November 1961 and the estimated 850 in 1962, it can be concluded that the berg potential for 1964 on the Grand Banks is well below normal, for both 1962 and 1963 were light ice years. However, it should be noted that the berg sizes were much larger than those surveyed before the 1963 season, and there were considerably more bergs (124) along the Labrador coast than the 20 counted there in mid-January of 1963. At any rate the 1964 Grand Banks iceberg year is forecast to be lighter than normal.

Ice and Weather Report

[By country]

Vessel	Weather reports	Ice reports
BELGIUM		
MV *Good Gulf*	20	-----
MV *Patignies*	4	-----
CANADA		
MV *Sioux*	22	2
MV *Terra Nova*	----	1
DENMARK		
MV *Heering Rose*	11	1
MV *Hugo Nielsen*	----	1
MV *Slesvig*	1	-----
MV *Spigerborg*	7	-----
MV *Thora Dan*	----	1
FINLAND		
SS *Augusta Paulin*	2	-----
SS *J. W. Paulin*	22	-----
FRANCE		
MV *Cleveland*	1	2
MV *Comandant Bourdais*	49	17
SS *France*	19	-----
MV *Jean L. D*	3	-----
MV *Le Moyne Diberville*	4	-----
MV *Lens*	19	-----
MV *Winnipeg*	16	-----
GERMANY		
MV *Alexandra Sartori*	1	1
SS *Anna Katrin Fritzen*	26	-----
MV *Anne Marie Krueger*	12	-----
MV *Anni Nuebel*	1	1

Ice and Weather Report—Continued

[By country]

Vessel	Weather reports	Ice reports
GERMANY—continued		
MV *Bernard Leonhardt*	6	-----
SS *Bremen*	1	-----
MV *Christian Sartori*	1	-----
MV *Clemens Sartori*	15	-----
MV *Constantia*	20	-----
MV *Dora Oldendorff*	13	1
MV *Elise Schulte*	7	1
MV *Erika Schulte*	12	2
MV *Erlangen*	2	-----
MV *Fairway*	2	-----
MV *Flensburg*	2	1
SS *Hanseatic*	8	-----
MV *Herman Schulte*	1	1
MV *Hinrich Oldendorff*	3	2
MV *Innstein*	15	2
MV *Konsul Schulte*	3	-----
MV *Kremsertor*	11	-----
MV *Lahnstein*	17	-----
MV *Leada*	12	-----
MV *Leamitra*	17	1
MV *Learina*	14	-----
MV *Lobivia*	9	-----
SS *Magdenburg*	14	-----
MV *Magalena Oldendorff*	1	2
MV *Maria Anna Schulte*	4	-----
MV *Mellum*	41	-----
MV *Mulheim Ruhr*	14	-----
MV *Neptun*	----	1
MV *Northa*	1	-----
MV *Procyon*	----	1
MV *Roland Russ*	----	1
MV *Scheersberg*	1	-----
MV *Schwanhein*	15	-----
MV *Seven Seas*	3	-----
MV *Transamerica*	5	-----
SS *Transatlantic*	1	2
MV *Transcanada*	3	2
MV *Transeurope*	3	-----
MV *Uranus*	8	-----
MV *Valeria*	1	-----
MV *Waldeck*	7	-----
MV *Weissenburg*	14	-----
MV *Wesermunde*	2	-----
MV *Willi Huber*	16	-----
GERMANY—continued		
MV *Yildun*	----	3
GREAT BRITAIN		
SS *Andania*	33	-----
SS *Asia*	4	-----
MV *Avery C. Adams*	13	-----
MV *Beaverash*	29	1
SS *Beavercove*	----	1
MV *Beaverelm*	18	-----
MV *Beaverfir*	10	-----
SS *Beaverglen*	15	-----
MV *Beaverpine*	24	-----
MV *Beechmore*	1	1
SS *Birmingham City*	24	2
SS *British Bulldog*	9	-----
SS *British Merchant*	2	-----
SS *Cairndhu*	41	3
MV *Cairnforth*	25	-----
SS *Cairngowan*	30	3
SS *Canuk Trader*	33	-----
SS *Carinthia*	26	3
MV *Carmania*	31	1
SS *Carrigan Head*	6	1
MV *Caxton*	34	1
SS *City of Brisbane*	3	2
SS *City of Coventry*	7	-----
MV *Clarkavon*	37	-----
MV *Constance Bowater*	3	-----
SS *Consuelo*	5	1
MV *Crispin*	3	1
SS *Cyrus Field*	3	3
MV *Dartwood*	3	3
MV *Dealmouth*	3	1
MV *Dunkyle*	----	1
SS *Empress of Britian*	43	-----
SS *Empress of Canada*	39	2
SS *Empress of England*	25	2
MV *Formentor*	17	1
SS *Gardenia*	1	1
MV *Gladys Bowater*	8	2
MV *Highland*	5	-----
MV *Imperial Star*	6	-----
MV *Iron Barque*	1	3
SS *Isaac Carter*	----	1
MV *Ivernia*	3	-----
MV *La Marea*	7	1

Ice and Weather Report—Continued

[By country]

Vessel	Weather reports	Ice reports
GREAT BRITAIN—con.		
MV *La Selva*	4	-----
MV *Letitia*	12	1
MV *Lindisfrane*	5	2
SS *Lismoria*	32	-----
SS *Lord Kelvin*	1	2
MV *Makeni Palm*	2	-----
SS *Manchester City*	9	1
MV *Manchester Faith*	5	1
MV *Manchester Fame*	6	-----
SS *Manchester Mariner*	25	1
SS *Manchester Merchant*	18	1
SS *Manchester Miller*	8	-----
SS *Manchester Port*	3	-----
SS *Manchester Regiment*	15	2
MV *Marengo*	14	2
SS *Mauretania*	6	-----
SS *Mawana*	5	-----
MV *Middlesex*	2	1
MV *Montcalm*	6	-----
MV *Montreal City*	4	1
MV *Naess Cavalier*	12	-----
MV *Naess Pioneer*	2	-----
SS *New York City*	36	-----
MV *Niceto De Larrina*	3	1
MV *Oregis*	1	1
MV *Photinia*	1	1
MV *Prospero*	7	-----
SS *Queen Elizabeth*	9	-----
SS *Ramore Head*	5	1
MV *Rapallo*	5	2
SS *Rathlin Head*	2	2
SS *Rialto*	18	-----
MV *Romanby*	31	3
SS *Roonagh Head*	5	-----
MV *Santona*	4	1
SS *Sarah Bowater*	----	1
MV *Sidonia*	5	-----
MV *Spenser*	1	1
MV *Sugar Importer*	----	2
SS *Sunek*	6	1
SS *Sunrhea*	3	-----
MV *Sycamore*	2	-----
SS *Sylvania*	46	-----
MV *Torr Head*	9	-----
MV *Trinculo*	27	-----
GREAT BRITAIN—con.		
SS *Venassa*	----	1
MV *Western Prince*	3	1
MV *Willowpool*	7	3
SS *Zinnia*	1	1
GREECE		
SS *Arkadia*	17	-----
SS *Linda*	1	-----
MV *Pandora*	2	-----
SS *Venus*	2	-----
ICELAND		
MV *Godafoss*	2	2
INDIA		
MV *Jala*	4	-----
MV *Jalagopal*	17	1
IRELAND		
SS *Irish Oak*	22	-----
SS *Irish Pine*	4	1
MV *Irish Rose*	7	-----
MV *Irish Willow*	2	-----
ISRAEL		
MV *Dagan*	7	-----
MV *Elat*	5	-----
SS *Israel*	3	-----
ITALY		
SS *Cristoforo Colombo*	31	-----
SS *Leonardo da Vinci*	1	-----
MV *Saturnia*	19	1
MV *Vulcania*	38	-----
MV *Zenobia Martini*	17	-----
JAPAN		
MV *Kunikawa Maru*	4	-----
MV *Sumida Maru*	13	-----
LEBANON		
MV *San John*	3	-----

Ice and Weather Report—Continued

[By country]

Vessel	Weather reports	Ice reports
LIBERIA		
MV *Alberta*	2	-----
SS *Aragon*	4	-----
MV *Clyde Ore*	10	-----
MV *Corcovado*	8	1
MV *Corsair*	1	-----
SS *Invicta*	----	1
SS *Nea Tyhi*	1	1
SS *Olympia*	43	-----
SS *Runner*	1	-----
MV *Sunflower*	1	-----
SS *Sunhenderson*	5	-----
SS *Transporter*	4	-----
MV *Tyne Ore*	3	-----
SS *World Banner*	8	-----
NETHERLANDS		
MV *Amsteldiep*	8	1
SS *Carrillo*	10	-----
MV *Dirk Taat*	1	-----
MV *Gorredyk*	7	-----
MV *Grebbedijk*	14	-----
MV *Katsedyk*	7	-----
MV *Kerkedyk*	7	-----
MV *Korendyk*	8	-----
SS *Maasdam*	22	-----
SS *Nieuw Amsterdam*	23	-----
MV *Noordam*	17	-----
MV *Prince Wm. G. Frederik*	10	1
MV *Prins Fred Henrik*	4	-----
MV *Provenierssingel*	2	-----
SS *Rotterdam*	15	-----
SS *Ryndam*	69	8
MV *Schelde Lloyd*	7	-----
MV *Sloterdyk*	6	-----
SS *Statendam*	6	-----
MV *Stadoutrecht*	1	-----
SS *Utrecht*	10	----
SS *Vivipara*	9	-----
MV *Westerdam*	16	-----
NORWAY		
MV *Anita*	1	-----
MV *Anne*	1	-----
MV *Askot*	1	-----
MV *Aurelian*	23	-----
NORWAY—continued		
MV *Baie Comeau*	5	1
MV *Benlicte*	3	-----
MV *Bore Alis*	4	-----
MV *Brott*	1	1
MV *Carrier*	2	-----
MV *Essex*	1	2
MV *Evita*	7	-----
MV *Farland*	----	1
MV *Favorita*	5	-----
MV *Fernfiord*	7	-----
MV *Ferngrove*	2	-----
MV *Filefjell*	4	-----
MV *Germa*	23	1
MV *Gisna*	7	1
MV *Gjendefjell*	10	3
MV *Krossfonn*	5	-----
MV *Lancelot*	2	-----
MV *Livanita*	----	1
MV *Lonn*	7	-----
MV *Lyngenfjord*	13	-----
MV *Makefjell*	1	1
MV *Marstenen*	6	1
MV *Meline*	6	1
MV *Nardo*	7	-----
MV *Nopal Branco*	2	2
MV *Oslofjord*	17	-----
MV *Polyana*	----	1
MV *Providence*	7	-----
MV *Skiensfjord*	11	1
SS *Stavangerfjord*	28	-----
MV *Superior*	6	-----
MV *Thorstream*	6	-----
MV *Topdalsfjord*	26	3
MV *Vikara*	6	-----
MV *Woodville*	8	-----
PANAMA		
SS *Esso Jamaica*	3	-----
SS *Homeric*	22	2
SS *Louise*	15	4
SS *Mary Ellen Conway*	1	-----
SS *Patricia*	5	-----
POLAND		
MV *Batory*	12	2

[By country]

Vessel	Weather reports	Ice reports
SPAIN		
MV *Elvira*	1	----
SWEDEN		
MV *Avafors*	10	----
MV *Birgit Ragne*	5	1
SS *Boheme*	14	----
MV *Borgholm*	1	1
MV *Barheholm*	3	----
MV *Fredrik Ragne*	18	1
MV *Gripsholm*	39	----
MV *Husaro*	9	----
MV *Isolde*	1	1
MV *Kastor*	1	1
MV *Kungsholm*	36	----
MV *Luossa*	22	1
MV *Matumba*	3	----
MV *Monica Smith*	3	----
MV *Nordia*	103	----
MV *Odensholm*	10	----
MV *Svaneholm*	4	----
MV *Tidaholm*	5	----
MV *Vaxholm*	12	----
MV *Wasaborg*	1	----
SWITZERLAND		
MV *General Guisan*	1	----
MV *Regina*	18	----
MV *Silvaplana*	7	----
UNITED STATES OF AMERICA		
SS *America*	65	----
SS *American Challenger*	41	----
SS *American Chief*	12	----
SS *American Chieftain*	1	----
SS *American Farmer*	1	----
SS *American Flyer*	6	----
SS *American Forwarder*	9	----
SS *American Harvester*	4	----
SS *American Manufacturer*	53	----
SS *American Press*	3	----
SS *American Producer*	36	2
SS *American Reporter*	17	----
SS *American Scientist*	27	----
SS *American Shipper*	32	----
UNITED STATES OF AMERICA—continued		
SS *American Trapper*	11	-----
SS *American Traveler*	17	-----
SS *Excalibur*	29	-----
SS *Exiria*	2	-----
SS *Export Agent*	1	-----
SS *Express*	12	-----
SS *Extavia*	8	-----
SS *Flying Spray*	1	-----
TE *Globe Progress*	1	-----
SS *Hoosier State*	3	-----
SS *Hurricane*	1	1
SS *Mormaccove*	21	-----
SS *Mormacelm*	7	-----
SS *Mormacoak*	6	1
SS *Mormacport*	8	1
SS *Mormacwind*	9	-----
SS *Mormacwren*	5	-----
SS *Pioneer Cove*	24	-----
SS *President Jackson*	1	-----
SS *Steel Admiral*	7	-----
SS *Steel Worker*	11	-----
MV *Thompson Lykes*	2	-----
SS *Transglobe*	39	-----
SS *Volverine State*	24	-----
YUGOSLAVIA		
MV *Vares*	3	-----
MV *Zenica*	7	-----
U.S. GOVERNMENT COAST GUARD		
USCGC *Bibb*	8	-----
USCGC *Campbell*	55	3
USCGC *Casco*	36	1
USCGC *Cook Inlet*	29	1
USCGC *Coos Bay*	25	7
USCGC *Duane*	45	3
USCGC *Eagle*	14	-----
USCGC *Escanaba*	30	4
USCGC *Evergreen*	307	7
USCGC *Mackinac*	4	1
USCGC *McCulloch*	7	7
USCGC *Mendota*	----	5
USCGC *Owasco*	2	2
USCGC *Spencer*	27	9
USCGC *Yakutat*	6	1

Vessel	Weather reports	Ice reports	Vessel	Weather reports	Ice reports
NAVY			MILITARY SEA TRANSPORTATION SERVICE—con.		
USS *Betelgeuse*	21	-----	USNS *General William O. Darby*	70	-----
MILITARY SEA TRANSPORTATION SERVICE			USNS *Greenville Victory*	12	-----
USNS *Blue Jacket*	31	-----	USNS *Lt. Robert Craig*	10	-----
USNS *Comet*	29	-----	USNS *Mirfak*	----	1
USNS *Cowanesque*	1	-----	USNS *Mission Buenaventure*	16	-----
USNS *Geiger*	64	-----	USNS *Point Barrow*	14	-----
USNS *General Alexander M. Patch*	57	-----	USNS *Redbud*	1	1
USNS *General Maurice Rose*	87	-----	USNS *Tallulah*	5	-----
USNS *General Simon B. Buckner*	76	-----	USNS *Upshur*	60	-----
			USNS *W. H. Gordon*	8	-----
			USNS *Wyandot*	5	----

NORTHERN ICEBERG SURVEYS

BACKGROUND

The very existence of the International Ice Patrol is due to the fact that icebergs threaten transatlantic shipping in the vicinity of the Grand Banks each spring and early summer. The mission of the Ice Patrol and its operations are based on the behavior of icebergs. A study of annual ice conditions since the inauguration of the International Ice Patrol in 1913 readily reveals that no two ice seasons are exactly similar, each having its own peculiar characteristics. It is true, however, that some generalities can be made. For example, the iceberg threat to shipping on the Grand Banks is usually confined to the months March through June, with the heaviest threat usually in April and May. Bergs are transported from the north in the Labrador Current and tend to be mainly concentrated in or near the Current and its branches during the ice season. Yet one wonders and marvels at the extreme fluctuations that can and have occurred from one year to the next. One needs only go back to 1957 and 1958. The year 1957 was one of the worst iceberg seasons on record, with over 900 bergs drifting south of the 48th parallel of latitude from January to August and hundreds of them invading the shipping lanes on or near the Grand Banks. The next year only one berg managed to drift south of 48° N., with no threat to the major lanes.

Why such a fluctuation from one season to the next? This question has been pondered by many who have been associated with the Ice Patrol over the years. Unfortunately, ice observation in areas upstream to the source of icebergs has been very scanty over the years, collecting insufficient data for determination of the facts which will allow proper analysis and yield an educated answer to the above question. In addition to the purely scientific reason of a search for more knowledge, surely the International Ice Patrol could perform more efficient services if more information could be obtained about bergs, their origin, their lifetime experiences, their characteristics, and reasons why they appear when they do near the Grand Banks to menace shipping.

Until more facts are obtained, some assumptions must be made. It would seem an oversimplification if the weather were to be blamed for these fluctuations, yet this is generally true. Certainly oceanographic factors must also be considered as, after all, the system of

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currents from source to termination is the transportation agency. However, changes in oceanographic conditions are for the most part originally due to atmospheric changes. At any rate, it is strongly believed that the transporting agency bearing its freight of icebergs may vary its speed and volume of flow from month to month, season to season, and year to year, but its direction is forever south-seeking and thus more stable and more constant in the effect on icebergs than the ever-variable atmospheric conditions. Meteorological factors in the area of origin of bergs have begun to mold the pattern of a Grand Banks iceberg season before a so-called annual crop of bergs have calved or been born and years prior to a particular ice season. The climatology of the area where berg-producing glaciers are located from year to year undoubtedly has a distinct effect on the glacier ice discharged from year to year. The indirect effect of climatology in the area on the timing of the breakup of the fast ice with subsequent calving and release of bergs from the fiords and bays each summer and the timing of the formation of fast ice and subsequent imprisonment of many bergs in the autumn of each year must be assumed to be an important factor. The climatology along the entire route traveled by the bergs is of considerable importance and believed of critical importance along the southeastern Baffin Island coast, Labrador coast, and eastern Newfoundland coast in the winter and spring preceding and during a given ice season on the Grand Banks. It is believed that the climatology of the areas above, especially selected for the 5–6 months' period when inhabited by the berg crop as it proceeds to the south, is most significant in controlling or altering control of the movement and deterioration of the berg crop. This is due to the direct influence of winds and temperature on the berg and the indirect influence of modifying the current system and its water temperatures. The bottom topography along the glacier to Grand Banks berg routes is also an important factor.

If only each berg that arrives on the Grand Banks could reveal its past, each would have its own story to tell. Its age as an entity or separate piece of drifting ice might vary from days to years. It may have spent months or years aground in various locations along the coasts of West Greenland, Baffin Island, Labrador, and Newfoundland, or it may have spent little or no time aground. Most bergs would admit to being born (calved) at the many glaciers near Disko Bay, West Greenland. Many have origins from other larger bergs long since born, and on rare occasions a berg may have traveled from East Greenland. Actually those bergs that arrive at the Grand Banks may be considered the select few, for it has been estimated that only 1 of every 40 bergs calved in West Greenland makes it to the Grand Banks. There is evidence that the majority perish in Baffin Bay, the waters of their origin. Many others are trapped in

the various bays, sounds, and indentations that adjoin Baffin Bay to slowly deteriorate, while others manage to reach the Labrador coast with little or no chance of arriving at the Grand Banks due to poor timing or otherwise being trapped and deteriorating prior to arrival at the Grand Banks. In spite of the individual fate of each berg calved, some generalities can be made regarding those few that reach the Grand Banks. First of all, they all have to drift loose from the glaciers in West Greenland and make it to the south-flowing Baffin Land Current with the proper timing of their arrival off Labrador so as to enable survival in the cold waters during winter and spring. Also, the Grand Banks bergs manage to avoid the numerous permanent traps along the route and are of sufficient size to guarantee survival. Considering all the natural obstacles, it is surprising that so many bergs successfully reach the Grand Banks.

Perhaps the reader now has a little insight into the reasons for the berg-threat anomaly from one season to another. It is incumbent upon Ice Patrol officers to search for data to definitely determine these reasons, for bergs are the business of the Ice Patrol and all possible knowledge about them should be vigorously pursued. Besides, the founders of the International Ice Patrol in 1913 were foresighted enough to provide for a study and observation of ice conditions during the whole of the year as advisable. The late Rear Adm. Ed. H. Smith, USCG, familiarly known as "Iceberg Smith," studied the problem of icebergs more than any one else and has undoubtedly made the greatest contributions to our present-day knowledge of icebergs. Smith, during his many years of association with the Ice Patrol, introduced the presently used oceanographic method of determining ocean currents by dynamic topography. Smith also made studies of the correlation between winter weather over the North Atlantic and the resulting severity of the iceberg threat on the Grand Banks, and developed a formula for forecasting the number of bergs south of 48° N. for the oncoming ice season. Smith also made special ice observation cruises aboard Coast Guard cutters to Baffin Bay to visit glaciers, witness calving, interview officials of settlements located near glaciers, survey as much of Baffin Bay as possible for iceberg counts, and generally to gather as much knowledge of icebergs as possible. Though Smith's formula for forecasting the number of bergs south of 48° N. for a given year was nearly correct some years, many years it unfortunately has been quite inaccurate. Smith recognized the shortcomings of his formula and the main reason for it. See pages 11–26, Bulletin No. 30 in this series. For, as he stated, an abnormal winter with severely cold northwest winds predominating during the winter and spring from Baffin Island to Newfoundland does not necessarily guarantee a severe Grand Banks iceberg year if the supply of bergs is not avail-

able. It must be obvious to all interested that any intelligent forecast of the coming Grand Banks iceberg season must take into account the available supply.

The ability to accurately forecast the relative iceberg threat to the Grand Banks has some value besides accumulating more knowledge of icebergs. Certainly there is great advantage in being able to warn the shipping world that a severe iceberg season is coming. Also, the Ice Patrol Office can plan its operations with greater efficiency and increase the efficiency of its services to shipping. Before getting too optimistic about the possibilities of very accurately forecasting the number of bergs south of 48° N. for the forthcoming ice season, certain hard realities must be acknowledged. As of early March, when the Ice Patrol usually is commenced, it is possible to accurately determine the weather over the past months, but as of now, reliable and dependable weather forecasts for 1 month ahead, let alone 3 or 4 months, are simply not available and until they are, berg forecasting is considerably limited. Another imponderable factor is the possibility of elimination of a large portion of a given year's supply by permanent trapping or by being driven far out to sea and permanently removed from the transporting agency. The trapping or removal from the transporting agency might be only temporary, but of duration to sufficiently delay the crop's southward advance so as to prevent its survival to the Grand Banks due to warming waters. As an example, it would be difficult to forecast that during a given period, just as the berg crop approaches Hudson Strait entrance from the north, a storm will arrive producing strong easterly winds driving most of these bergs into the permanent or semipermanent trap of Hudson Strait. Also, it is most difficult to attempt to forecast the calving of smaller bergs from larger ones. For example, about the time a very large berg about 250 ft. high, 700 ft. long, and 500 ft. wide is approaching the Grand Banks, it could conceivably break up into four or five small bergs at once or it might gradually deteriorate by melting and calving growlers and pieces of brash. Another shortcoming is the lack of oceanographic data in the northern areas during the winter and spring months and the impracticability to obtain same. The point in the above discussion is not to belittle attempts at berg forecasting, but to emphasize the problems involved, problems which may defy satisfactory solution for many years.

The question can be asked, "Why not go to the source or heart of the problem, i.e., the berg-producing glaciers of northwest Greenland and count how many bergs are produced each year?" This apparently was the course of action followed by Smith in his September 1940 iceberg census aboard the USCGC *Northland*. Also, aerial iceberg censuses of all of Baffin Bay were accomplished in the summers of 1948 and 1949 for the purpose of determining year classes, berg travel-times, and to improve berg forecasting. Undoubtedly, the Smith

1940 census and the 1948 and 1949 aerial censuses were most ambitious, have produced most of our available knowledge of bergs in that area, and have allowed some correlation between berg counts in Baffin Bay and subsequent iceberg-years on the Grand Banks. For example, the 1948 visual count was about 12,000 bergs as compared to 17,500 visually counted in 1949. Since the 1949 survey was in August and the 1948 survey in July, this difference can be attributed to the fact that the 1949 survey included an additional month's calving of bergs. A comparison of the number of bergs along the east coast of Baffin Island from Cape Dyer north and well removed from the productive glaciers is quite significant. The 1949 count was about three times the 1948 count. See Bulletins 34 and 35 in this series. The 1949 Grand Banks iceberg season was very light, correlating with the apparent low supply of 1948, and the 1950 season was heavy. It is especially noted that both the 1948 and 1949 iceberg censuses revealed that there were more than nine times as many bergs in the eastern half of Baffin Bay as in the western half. Smith's 1940 census with the CGC *Northland* also revealed a preponderance of bergs in the eastern half of Baffin Bay. At first glance this might indicate very heavy attrition of bergs from the glaciers in eastern Baffin Bay to the south-moving Baffin Land Current in western Baffin Bay. Smith in 1940 observed that the fiords leading to some of the most prolific glaciers were so jammed with icebergs that it took an estimated 5 years for a renewal of icebergs there. Undoubtedly some of the smaller bergs literally never get off the ground and deteriorate completely while still imprisoned in the fiords, and many more deteriorate without ever departing eastern Baffin Bay.

The effect of pack ice on bergs is another factor that must be considered. Pack ice can be an aid or an obstacle to the travel of bergs. Bergs located in protected waters close along the coasts of Baffin Bay as winter arrives are probably imprisoned by the formation of fast ice until the breakup next summer. Bergs which are offshore as the freezeup occurs probably have an excellent opportunity to keep traveling. The pack ice may then act as a buffer to prevent bergs from being driven aground or being driven into the many traps along the route. This latter effect is probably most significant during the winter months along the Labrador coast. In Smith's time, the popular conception was that practically the entire Baffin Bay was covered with fast ice from late autumn to early summer halting the motion of icebergs. Since 1940, considerable ice reconnaissance by the U.S. Navy over Baffin Bay has proven that there are many open water areas and that offshore ice is in constant motion year round. The net result of the pack ice effect on the travel of the berg supply from source to termination is difficult to assess and can only be assumed. While its effect might be negative in Baffin Bay, it is probably positive along the southeast Baffin Island coast and the

coasts of Labrador and Newfoundland by acting as a preservative in maintaining a colder climate for bergs and reducing wave erosion.

In order for a berg to travel from its origin in northwest Greenland to the Grand Banks, it must first of all succeed in drifting into the south-moving Baffin Land-Labrador Current system. Limited but inconclusive evidence indicates that bergs travel northwest from the glaciers along the west Greenland coast then west, passing south of Smith Sound and eventually drifting south along Baffin Island in the counterclockwise current system of Baffin Bay. There is no doubt that some bergs drift west or southwest from the glaciers directly across to western Baffin Bay either due to favorable easterly winds or branch currents or both. The question is how many from year to year. Secondly, the berg must be of sufficient size and must time its arrival along the Baffin Island Coast so as to drift south along the Labrador coast in the colder winter and early spring months. If the timing is off and travel along the Labrador coast is performed in late spring, summer, or early autumn, chances of survival to the Grand Banks are only remotely possible. Smith attributed the seasonal threat of icebergs on the Grand Banks to the seasonal character of berg calving at the glaciers. However, it is believed that the winter climatology of the Continental Shelf waters from Davis Strait to the Grand Banks is the main cause of the seasonal nature of the annual invasion of bergs.

Since berg attrition is suspected to be heavy from eastern to western Baffin Bay, and since many, if not most, arrivals into the south-moving Baffin Land Current are poorly timed, a great majority of the Baffin Bay bergs are ineffectives as future Grand Banks bergs. To separate those most likely to succeed from the ineffectives is probably going to the heart of the problem, but also overzealous. While it it would be most difficult to accurately forecast the number of bergs that will timely arrive at a favorable position for drift to the Grand Banks, this number can be determined by aerial reconnaissance. It is advocated therefore that the problem should be attacked by going as far upstream as is necessary at the proper time to determine the Grand Banks iceberg potential for the coming season and to accumulate data necessary for computing berg traveltimes, drift rates, deterioration rates, mortality rates, and other berg characteristics.

It is proposed that at least one berg census be taken each year in the late autumn from Newfoundland along the Labrador coast, Hudson Strait, and Frobisher Bay entrance, and the Baffin Island coast to at least Cape Dyer. With tracks 20 miles apart, coverage will include the Continental Shelf to 80 miles offshore and will account for most of the next year's Grand Banks iceberg potential. An additional berg census north to Hudson Strait about 1 March and just prior to the commencement of the Ice Patrol is also highly desirable. The late autumn census will determine the available potential and enable a

rough forecast of survivors expected to reach 48° N. with normal weather conditions for the ensuing months. As the weather conditions are monitored each month for the areas to which the crop has progressed, the forecast can be refined. The late February or early March census would enable a more accurate forecast and would enable precise determination of the progress of the berg potential, as well as establish more data and more facts about icebergs.

In order to help determine the location of the berg potential for the coming ice season, it is necessary to study all available iceberg statistics compiled by the International Ice Patrol over the years. These statistics show that bergs are a threat to shipping on the Grand Banks almost entirely during the 4-month period of March through June. Since 1946, when aircraft were first used by the Ice Patrol for ice surveillance, 94 percent of the total number of bergs drifting south of 48° N. did so during those 4 months, with 64 percent of the total doing so during April and May. Table III shows the approximate dates that the first concentration of icebergs arrived at the Grand Banks and approximate dates when the Grand Banks have become free of icebergs annually since 1946.

Table III

Year	Approximate date arrival bergs, Grand Banks [1]	Approximate date end of ice season, Grand Banks [1]	Year	Approximate date arrival bergs, Grand Banks [1]	Approximate date end of ice season, Grand Banks [1]
1946	12 March	28 July.	1955	25 March	15 July.
1947	23 April	25 July.	1956	20 March	13 July.
1948	14 March	7 July.	1957	1 February	10 August.
1949	31 March	15 June.	1958	15 May	16 June.
1950	15 February	26 June.	1959	24 March	17 July.
1951	25 February	18 May.	1960	15 April	5 July.
1952	15 April	16 June.	1961	20 February	1 July.
1953	16 March	6 June.	1962	5 March	1 July.
1954	15 February	16 July.	1963	20 March	20 June.

[1] Does not take into account occasional stragglers that might drift onto Grand Banks any month of year.

Based on a review of annual ice conditions and the data in table III, the following conclusions can be made:

1. The average date of arrival of bergs on the Grand Banks since 1946 is 15 March.

2. The average date of the end of the ice season since 1946 is 1 July.

3. The Grand Banks iceberg season lasts an average of 3½ months.

4. For the past 18 years of record, the greatest deviations of the length of ice season occurred in 1957 and 1958, with seasons of 6½ months and 1 month, respectively.

5. Ordinarily, bergs which are north of the Grand Banks to perhaps Davis Strait in late June or early July will most likely deteriorate prior to arrival on the Grand Banks due to warming waters.

6. Prior to the start of an ice season, there is a group of bergs upstream and favorably located for reaching the Grand Banks

between the approximate period March 15 to July 1. Bergs both north and south of the location of the berg potential can be considered ineffectives for the most part. Those southerly located bergs will ordinarily keep drifting south, eluding the advancing formations of protective pack ice and freezing waters as winter arrives. Unless such a berg is very large, it stands little chance of making it to the Grand Banks as deterioration is continually in progress.

7. The variations of the period known as the Grand Banks iceberg season and the variations of the severity of iceberg seasons are undoubtedly due to the annual variations of the location and extent of the berg potential upstream at a given time before the season and the winter and spring variations of local meteorological and oceanographic conditions and their effect on the berg supply.

Combining the conclusions from table III with factors discussed previously, the location of the berg potential for the coming year can be roughly estimated. Aerial reconnaissance can then be planned to cover the predicted area with sufficient overlap to enable determination of the location and extent of the berg potential for the coming year. It is assumed that the leading edge of the group will usually be rather obvious, but the northern limit will be less obvious depending on the forecast average berg drift rate in the progression downstream. As these northern flight results are supplemented by information obtained from aerial reconnaissance prior to and during the ice season on the Grand Banks and upstream as practicable, additional facts will become known.

Berg counts were made in early November of 1961 in Baffin Bay, Davis Strait, Hudson Strait, and the coastal waters of northern Labrador by the Canadian Department of Transport during their annual ice reconnaissance flights in this area. About 800 bergs were located near the entrance of Hudson Strait and Frobisher Bay; 150 from Cape St. David to Cape Dyer, Baffin Island; and 1,000 from Cape Dyer to Cape Christian, Baffin Island. There were very few bergs south of Cape Chidley. Combined with the above information. subsequent ice observation flights by U.S. Coast Guard Air Detachment, Argentia, Newfoundland, prior to and during the 1962 Ice Patrol enabled the following determinations:

1. The average drift rate of bergs from Cape Chidley, Labrador, to the Grand Banks during the period November 1961 to March 1962 was 7.5 miles per day.

2. The traveltime of bergs from Cape Chidley to the Grand Banks was 4 months.

3. Bergs north of Frobisher Bay in early November 1961 drifted at an estimated average rate of 5.8 miles per day and were not able to arrive at the Grand Banks before June 1962.

4. Bergs north of Cape Dyer were not a factor in the 1962 ice season.

Table IV summarizes berg statistics for the 1962 season. The average surface winds from November to June were neither favorable nor unfavorable for southern berg transport for the first group and very unfavorable for the group north of Cape Dyer. See table V for estimated average monthly surface wind conditions and the estimated effect on berg drift toward the Grand Banks based on U.S. Weather Bureau monthly mean sea level barometric charts.

Aerial ice reconnaissance by the Canadian Department of Transport in early November 1962 determined that about 400 bergs were located in the vicinity of the Hudson Strait entrance, 400 bergs from Cape St. David, Baffin Island, to Cape Dyer to Cape Christian. Compared to the November 1961 berg counts in the same areas, the berg potential was less (800 vs. 950) as far as Cape Dyer, and much less (250 vs. 1,000) north of Cape Dyer. If the meteorological and oceanographic factors in the berg crop area for the next 6 months would be similar to the 1961–62 conditions, a light iceberg season was in prospect.

THE NORTHERN BERG SURVEYS OF 1963

A significant event in the International Ice Patrol annals occurred on 13–14 January 1963 when an HC–130B (Lockheed Hercules) aircraft of U.S. Coast Guard Air Detachment, Argentia, Newfoundland, made an iceberg survey along the eastern coast of Labrador, to and including Hudson Strait entrance and Frobisher Bay. The main purpose of the survey was to determine the location and the extent of the 1963 Grand Banks iceberg crop. Other objectives included eventual determination of berg traveltimes, drift rates, deterioration rates, mortality percentages, and acquiring other pertinent ice data. The flight planning took into consideration the available established facts based on ice observation, especially those for the 1962 berg crop, and the assumptions discussed previously. It was calculated that the area surveyed would include the major portion of the 1963 Grand Banks crop up to June unless abnormal climatological conditions accompanying the crop were very favorable for southern transport and survival. Only 20 bergs were located along the entire Labrador coast, and only 65 bergs were located near Hudson Strait entrance. See figure 18 for the flight tracks, coverage area, and berg plot. The visibility in the area east and north of Hudson Strait entrance was poor and it is estimated several bergs in this area were not sighted. Radar was used but found generally unreliable for detecting any but larger bergs in the pack ice. Except for a few periods of poor visibility, no difficulty was otherwise experienced in distinguishing bergs in the pack ice.

The survey indicated without a doubt that 1963 would be a very light iceberg year for the Grand Banks at least until mid-May, regardless of possible abnormal meteorological and oceanographic

Table IV. 1962 Berg Statistics Based on Canadian November 1961 Berg Counts and Ice Patrol Ice Observation in 1962

Berg group by location, early November 1961	Estimated number bergs	Estimated arrival period off Belle Isle	Estimated survivors to Belle Isle (percent)	Estimated arrival period, Grand Banks	Estimated number survivors south of 48° N.	Estimated average drift rate toward Grand Banks (miles per day)	Estimated average wind conditions during travel time
Cape Chidley, Labrador, to Cape Dyer, Baffin Island, including Hudson Strait and Frobisher Bay entrance. From coast to approximately 60 miles offshore.	950	30 Jan–31 May	52	1 Mar.–30 June	119	7.5	Neutral.
Cape Dyer to Cape Christian, Baffin Island. From coast to approximately 60 miles offshore.	1,000	1 June–1 Sept	10	None	1	5.8	Very unfavorable.

Table V. Average Monthly Surface Wind Conditions for Berg Drift Toward Grand Banks 1962 Ice Season

[Based on U.S. Weather Bureau monthly mean sea level barometric charts]

Berg group by location, early November 1961	November 1961	December 1961	January 1962	February 1962	March 1962	April 1962	May 1962	June 1962	Average for period November 1961–June 1962
Cape Chidley, Labrador, to Cape Dyer, Baffin Island.	SU	VU	VF	F	VU	SF	—	—	Neutral.
Cape Dyer to Cape Christian, Baffin Island.	VU	VU	U	F	VU	U	U	U	Very unfavorable.

CODE:
F = Favorable.
U = Unfavorable.
— = Neutral.
V = Very.
S = Slightly.

conditions. An immediate question raised by the flight results was, "Whatever happened to the 800 bergs located in early November 1962 from Hudson Strait entrance to Cape Dyer, Baffin Island?" They had literally if not actually vanished. A ready answer is revealed by the U.S. Weather Bureau November and December 1962 monthly mean sea level barometric charts. Both charts and also the mid-December to mid-January chart indicate average strong offshore winds during the period. The major portion of the 1963 Grand Banks iceberg crop had probably been driven eastward out of the south-moving Labrador Current into warmer waters and been removed as a threat to the Grand Banks. A couple of these bergs were subsequently sighted on Ocean Station Bravo near 56° N., 51° W., in late March, having been driven south from between Labrador and Greenland by strong northerly winds in March.

A second aerial iceberg survey was conducted along the coast of Labrador to Frobisher and return on 13–14 March 1963. See figure 19. A total of 119 bergs were located south of Cape Chidley, with an estimated 20 bergs not sighted due to limited visibility in some areas and 10 bergs south and east of the flight coverage. There were 120 bergs counted near Hudson Strait entrance, but the visibility was poor here and it is estimated there were several more bergs in this area. Those bergs just north of Cape Chidley in mid-January had drifted to a position just northeast of Hamilton Inlet, a distance of about 460 miles in 60 days for an average drift rate of 7.6 miles per day. Average surface winds were estimated unfavorable for southward berg drift along the Labrador coast in January and favorable from early February to mid-March, or favorable during the period between surveys.

An analysis of the information obtained from the two northern iceberg surveys combined with results from the seasonal International Ice Patrol flights enabled the following determinations for the 1963 berg crop:

1. The few bergs that crossed south of 48° N. drifted at an average rate of 7.6 miles per day from mid-January to mid-March. During the last half of March and early April, these bergs drifted from just north of Hamilton Inlet at an average rate of 18 miles per day under very favorable winds, for an overall average rate of 9 miles per day from Cape Chidley to the Grand Banks.

2. The traveltime of the above group of bergs from Hudson Strait entrance to the Grand Banks was about 3½ months.

3. Many of the bergs in the vicinity of Hudson Strait entrance in mid-March arrived off Belle Isle in late May for an average drift rate of 8.5 miles per day. Only a couple of these bergs were able to make it to just north of the Grand Banks at the end of June for an average drift rate of 8.6 miles per day and a traveltime of 3½ months

from Hudson Strait entrance to just north of the Grand Banks. Wind conditions averaged slightly favorable for this group of bergs.

4. Berg drift rates were determined on the basis of berg counts and are averages for groups. It was possible to trace a few individual bergs on the basis of their large size and distinctive shape. It is noteworthy that the many smaller bergs traveled at a faster average rate than the individual large bergs. This is explained by the fact that the large bergs, whose draft may exceed 600 feet, are bound to spend greater periods of time aground during the journey south. A considerable portion of the Labrador Current flows over the Continental Shelf inside the 100-fathom curve. This factor is believed most significant in delaying southward transport of the larger icebergs.

5. Of the estimated 800 bergs from Hudson Strait entrance in early November 1962, only 25, or 3 percent, drifted south of 48° N.

6. Bergs north of Cape Dyer in early November were not a factor in the 1963 season as they deteriorated prior to reaching the Grand Banks. The average winds for this group of bergs were estimated to be unfavorable from early November to June.

Table VI has detailed berg statistics for 1963. Table VII lists average monthly wind conditions for the period preceding and during the 1963 ice season.

CONCLUSIONS

The following conclusions are based on information obtained from the 1963 iceberg surveys, information on icebergs accumulated over the years, and assumptions discussed earlier in this section.

1. The Grand Banks iceberg crop for the coming year can be located and assessed up to a few months prior to the ice season. In early November the Grand Banks berg potential for the coming ice season is mostly located from the vicinity of Hudson Strait entrance to Cape Christian, Baffin Island, assuming normal meteorological and oceanographic conditions during the next 6 or 7 months. Bergs south of Cape Chidley in early November will ordinarily deteriorate prior to reaching the Grand Banks.

2. Bergs must ordinarily be south of Cape Chidley, Labrador, by mid-March to successfully survive to the Grand Banks.

3. The average travel time of the 1962 berg crop from Hudson Strait to the Grand Banks was an estimated 4 months. Surface winds averaged neutral for southern berg drift during the travel period. The average traveltime for the 1963 berg crop is somewhat ambiguous, as it is believed that almost the entire first half of the berg crop was driven out of the Labrador Current and out to sea between northern Labrador and Greenland. A few bergs located near Hudson Strait entrance in mid-January arrived at the Grand Banks in mid-April under favorable winds for a traveltime of 3 months. Another group located near Hudson Strait entrance in mid-March arrived north of

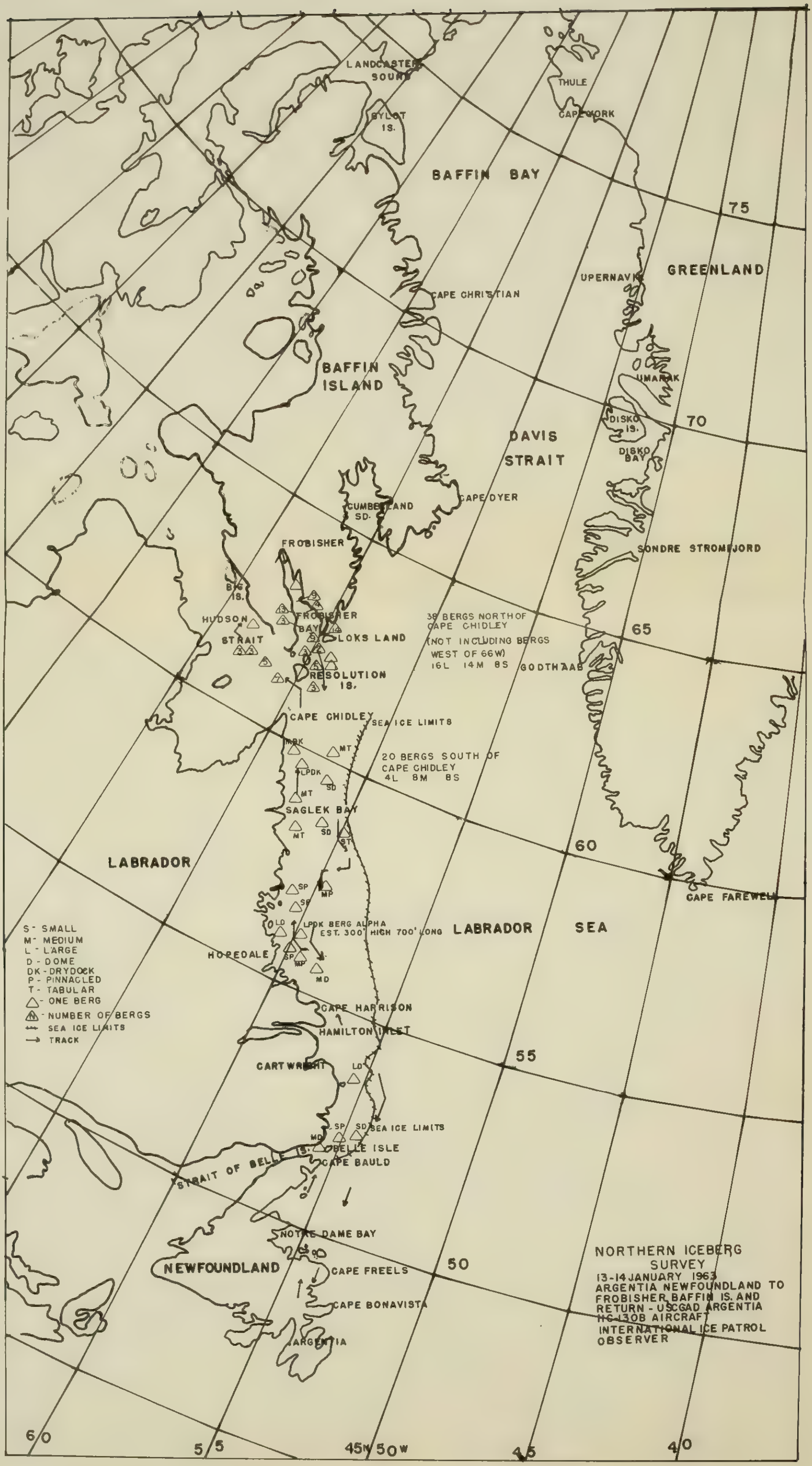

FIGURE 18.—Preseason iceberg survey, 13–14 January 1963.

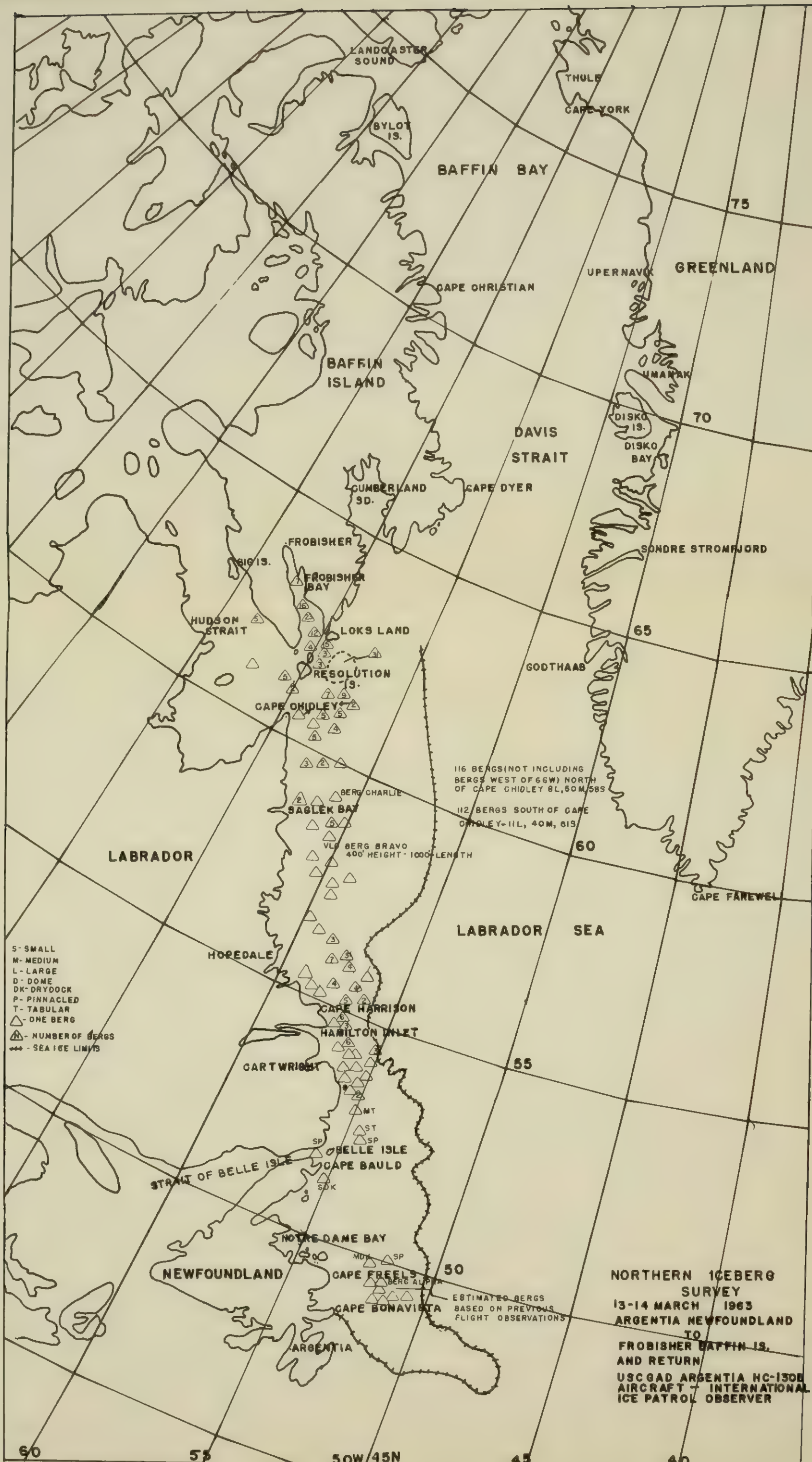

FIGURE 19.—Preseason iceberg survey, 13–14 March 1963.

Table VI. 1963 Berg Statistics Based on November 1962 Berg Counts, Special January and March Northern Surveys, and Ice Patrol Ice Observation in 1963

Berg group by location and time	Estimated or counted number bergs	Estimated arrival period off Belle Isle	Estimated survivors to Belle Isle (percent)	Estimated arrival period Grand Banks	Estimated number survivors south of 48° N.	Estimated average drift rate toward Grand banks (miles per day)	Estimated average wind conditions during traveltime
Cape Chidley, Labrador, to Cape Dyer, Baffin Island. Early November 1962.[1]	800	1 Mar.–15 June	34	15 Mar.–1 July	25	(2)	Unfavorable.
Cape Dyer to Cape Christian, Baffin Island. Early November 1962.	250	15 June–1 Aug.	10	None	0	5.1	Do.
Labrador coast, Belle Island, to Cape Chidley. Mid-January 1963.	20	15 Jan.–20 Mar.	100	15 Mar.–1 Apr.	10	(3)	Favorable.
Vicinity Hudson Strait entrance. Mid-January 1963	130	20 Mar.–1 Apr.	90	1–15 Apr.	14	9.0	Do.
Labrador coast, Belle Isle to Cape Chidley. Mid-March 1963.	119	15 Mar.–10 May	75	1 Apr.–1 July	15	7.3	Neutral.
Vicinity Hudson Strait entrance. Mid-March 1963	120	10 May–5 June	50	None	0	8.6	Slightly favorable.

[1] Bergs well up Hudson Strait and Frobisher Bay or west of 66° W. not included.
[2] Indeterminate. No berg grouping available.
[3] Indeterminate. Most of the 400 bergs vicinity Hudson Strait entrance in early November were believed driven out to sea in December to perish between Labrador and Greenland.

Table VII. Average Monthly Surface Wind Conditions for Berg Drift Toward Grand Banks 1963 Ice Season

[Based on U.S. Weather Bureau monthly mean sea level barometric charts]

Berg group by location and date	November 1962	December 1962	January 1963	February 1963	March 1963	April 1963	May 1963	June 1963	Average for period November 1962–June 1963
Cape Chidley, Labrador, to Cape Dyer, Baffin Island. Early November 1962.	U	U	U	F	VF	U	U	—	Unfavorable.
Cape Dyer to Cape Christian, Baffin, Island. Early November 1962.	U	VU	VU	SU	VF	U	F	—	Do.

Code:
F = Favorable.
U = Unfavorable.
V = Very.
S = Slightly.
— = Neutral.

the Grand Banks in late June under slightly favorable winds for a traveltime of 3½ months. With neutral wind drift conditions, it is concluded that the traveltime from Hudson Strait entrance to the Grand Banks is 4 months. However, normal wind conditions along the coast of Labrador from November through March are favorable for berg drift toward the Grand Banks. Under normal conditions therefore, it is concluded that the average berg traveltime from Hudson Strait entrance to the Grand Banks is 3 months during the winter. With very favorable wind conditions, the traveltime can probably be reduced to less than 2½ months. With very unfavorable wind conditions, traveltime can probably be increased to 6 months.

4. The average drift rate for the 1962 berg crop from early November at Hudson Strait entrance to March on the Grand Banks was 7.5 miles per day under neutral winds. The average drift rate for the 1963 crop is ambiguous for the same reason stated above. However, bergs near Hudson Strait entrance in mid-January 1963 drifted at an average rate of 7.6 miles per day to just north of Hamilton Inlet by mid-March under slightly favorable winds. During the last half of March and early April, these bergs drifted at a rate of 18 miles per day to the Grand Banks under very favorable winds for an overall average of 9.0 miles per day from Hudson Strait entrance to the Grand Banks. Drift rates for bergs north of Cape Dyer in early November were estimated to be 5.1 miles per day in 1962 and 5.8 miles per day in 1963, with unfavorable winds both years. Drift rates for other groups were also determined in 1963, varying from 7.3 to 9.0 miles per day along the Labrador coast toward the Grand Banks. Although variations in average drift rates are subject to other factors besides wind conditions such as bottom topography, sea ice conditions, and variations in the speed and extent of the transporting agency, the establishment of average berg crop drift rates for various monthly wind conditions will permit an educated estimate of the progress of the berg crop toward the Grand Banks each year. Normal average winds off the Labrador and northeast Newfoundland coasts are northwesterly during the winter and spring months. Thus it is believed that the drift rates established during the 1962 and 1963 seasons are lower than normal due to unfavorable surface wind anomalies for both years. There is evidence that the average berg drift rates are less along the Baffin Island coast than along the Labrador coast and greater offshore of the northeast Newfoundland coast.

5. Bergs north of Cape Dyer in early November were not a factor in either the 1962 and 1963 Grand Banks ice seasons. Only one berg north of Cape Dyer in November was estimated to drift south of 48° N. The estimated average drift rate for these bergs was 5.1 miles per day in 1962 and 5.8 miles per day in 1963. Winds averaged unfavorable in 1962 and very unfavorable in 1963. It must be con-

cluded that with normal favorable winds from November to June, bergs north of Cape Dyer can make it to the Grand Banks by late April or early May. Therefore an early November survey should extend north to Cape Christian. It is believed that an early Deember survey need extend only to Cape Dyer.

6. Nearly all the bergs located along the Labrador coast in mid-January arrived at the Grand Banks. Meteorological conditions averaged favorable for south drift and favorable for berg survival due to average northwest cold air circulation over the area from mid-January to early April. Unless there is significant permanent stranding of bergs en route to the Grand Banks from the Labrador coast, berg attrition is very low in the winter months. The pack ice is probably an important factor here in acting as a buffer to keep bergs from stranding and also preserving the bergs by maintenance of cold temperatures and reduction of wave erosion.

7. The percentage of available bergs entering Hudson Strait in the autumn and winter months may have a considerable influence on the forthcoming Grand Banks berg season. The *Marion* expedition in 1929 indicated that a branch of the Baffin Land Current entered northern Hudson Strait, recurving near Big Island and flowing out the southern side to rejoin the main branch now designated the Labrador Current. Tidal currents and average winds also undoubtedly have a considerable effect on the percentage of bergs entering Hudson Strait. It is plausible that during some years a considerable portion of the berg crop might be destroyed by being driven into Hudson Strait and permanent stranding by prevailing easterly winds as the crop approaches Hudson Strait entrance. Little evidence on hand supports the theory that most of the bergs entering Hudson Strait will eventually drift out through the southern entrance. Canadian Department of Transport flights over the past few years indicate that there are about three times as many bergs in northern Hudson Strait as in southern Hudson Strait, with considerable stranding along the southern Baffin Island coast. The northern surveys in January and March 1963 and subsequent ice observation indicated that almost all of the 1963 crop has drifted south from Davis Strait across the entrance of Hudson Strait to Labrador without taking the detour into Hudson Strait.

8. An estimated 13 percent of the bergs located from Hudson Strait entrance to Cape Dyer in early November 1961 drifted south of 48° N. in 1962. For the 1963 season, an estimated 3 percent of the bergs from Hudson Strait entrance to Cape Dyer in early November 1962 drifted south of 48° N. These percentages are believed less than normal due to average unfavorable meteorological conditions for berg drift south and berg survival both years. It is estimated that about 25 percent of the berg crop located from Cape Chidley to Cape Dyer in early November will drift south of 48° N. under normal meteorological conditions during

the period November–June. Also, some bergs from north of Cape Dyer will make it. Under very favorable conditions, the survival percentage might increase to 40 percent, with a sizable number from north of Cape Dyer. Considerably more data must be accumulated over the years to obtain accurate survival percentages. Of course, the surveys must take into account the individual berg sizes and the forecast survival must be based both on the berg count and berg sizes. An estimated 50 percent of the bergs along the Labrador coast in mid-January of 1963 drifted south of 48° N., with an estimated 90 percent drifting south of 49° N. These percentages may be higher than normal due to very favorable meteorological conditions during March for berg drift south and berg survival and a minimum of permanent stranding. An estimated 18 percent of the bergs south of Cape Chidley, Labrador, in mid-March 1963 drifted south of 48° N. This is believed somewhat less than normal due to generally unfavorable meteorological conditions from mid-March through May. Perhaps closer to 30 percent of bergs south of Cape Chidley in mid-March survive to drift south of 48° N. under normal meteorological conditions from mid-March to June.

9. All available evidence indicates that almost all of the berg crop drifts south by Cape Dyer. Very few bergs are supplied from West Greenland to the Baffin Land Current south of Davis Strait. Berg-producing glaciers are almost nonexistent south of Disko Bay, West Greenland. Many bergs of East Greenland origin do drift west around Cape Farewell and then north in the West Greenland Current, but it is concluded that very few ever reach the Labrador Current.

10. A reasonable forecast of the severity of the next Grand Banks iceberg season can be made in late autumn by determining the available supply of bergs upstream. In early November the Grand Banks berg potential will normally be located from Cape Chidley, Labrador, to Cape Christian, Baffin Island. By early December the berg potential will have progressed to near 57° N. along the Labrador coast and will include the area along the Continental Shelf north to about Cape Dyer. Assuming normal meteorological and oceanographic conditions for the next 6 or 7 months, about 25 percent of the berg potential can be forecast to drift south of 48° N. Thus a count of about 1,500 bergs would indicate a normal Grand Banks iceberg year. A count of over 2,500 bergs would indicate a heavy year, and a count less than 1,000 a light year. The survivor percentage used for the forecast should be prejudiced by berg sizes. Bergs should be classified small ($<50'$ height, $<200'$ length); medium ($50'$–$150'$ height, $200'$–$500'$ length), large ($150'$–$250'$ height, $>500'$ length); and very large ($>250'$ height). For tabular types the following sizes should be used: small ($<20'$ height, $<300'$ length); medium ($20'$–$50'$ height, $300'$–$600'$ length); and large ($>50'$ height, $>600'$ length). The forecast can be modified

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as average monthly meteorological conditions in the area become known.

11. For a more accurate forecast, another survey can be made in late February or early March north to Hudson Strait entrance. Bergs north of 57° N. in mid-March 1963 did not survive to the Grand Banks under unfavorable meteorological conditions. With normal meteorological conditions, it is concluded that bergs north to at least Hudson Strait entrance will be a factor. An estimated 30 percent of this berg count can be forecast to survive to south of 48° N. The forecast can be modified if the berg distribution, berg sizes, or other factors so indicate.

SUMMARY

The special northern iceberg survey flights conducted in January and March 1963 supplemented with information from Canadian Department of Transport flights in the autumn of 1961 and 1962 and the Ice Patrol ice observation flights have been very useful in helping to establish certain facts regarding berg counts, traveltimes, drift rates, survival rates, and also the location at certain times and the potential of the annual berg crop. The determinations are based on data for only the 1962 and 1963 ice seasons, and considerable variation can be expected from year to year. However, as iceberg data are accumulated and correlated with all available and pertinent meteorological and oceanographic factors, certain generalizations can be made regarding the location and extent of the berg crop, the traveltimes, and survival rates, and the capability will develop to fairly accurately forecast the severity of the iceberg season for the Grand Banks before the season starts.

PHYSICAL OCEANOGRAPHY OF THE GRAND BANKS REGION AND THE LABRADOR SEA IN 1963[1]

By Alfred P. Franceschetti, V. W. Driggers, and R. M. O'Hagan, U.S. Coast Guard

The 180-foot tender class cutter USCGC *Evergreen* was again the oceanographic vessel of the International Ice Patrol for the fieldwork of 1963.

The *Evergreen* departed Woods Hole on 26 March to conduct the first oceanographic survey of the 1963 season. The survey covered the waters over and immediately seaward of the southern and eastern slopes of the Grand Banks from just westward of the Tail of the Banks northward to section T, approximately 45°–40° N. The work of collection of data began at station 8387, located off the southwestern slope of the banks, on 30 March and progressed from south to north to station 8443 along section T when on 8 April, because of a fathometer breakdown and the proper replacement parts not being immediately available, the survey was stopped and the *Evergreen* proceeded to Argentia, arriving on 10 April.

The second survey covered the waters over and immediately seaward of the eastern and northeastern slope of the Grand Banks from section T where the first survey was stopped and included Flemish Cap and the Bonavista triangle. The work of collection of data began at station 8444 on 15 April and progressed from south to north with the final station, No. 8543, being completed on 25 April. The *Evergreen* then proceeded to Argentia, arriving there on 27 April and after an overnight layover proceeded to Boston.

A combined third and fourth survey similar to the first and second was conducted as one survey. The *Evergreen* departed Boston, Mass., on 11 May to begin the third current survey, arriving on station, No. 8544, on 14 May. The collection of data was completed on 31 May at station 8697 whereupon the *Evergreen* proceeded to Argentia, arriving on 2 June. After a brief stop, the *Evergreen* then proceeded to Boston.

In addition to the normal postseason survey consisting of the Bonavista triangle and Labrador Sea section between South Wolf Island, Labrador, and Cape Farewell, Greenland, the *Evergreen* collected oceanographic data in Kennedy Channel, Kane Basin, Smith Sound, and Upper Baffin Bay. The report of this survey will appear

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[1] To be reprinted as contribution No. 1456 in the Collected Reprints of the Woods Hole Oceanographic Institution.

as U.S. Coast Guard Oceanographic Data Report CG–373–5. Ice Island WH–5 had been blocking Kennedy Channel since the previous winter, and as a result the surveyed areas were completely ice free except for a few bergs along both shores. There are no records of a similar situation having occurred prior to this summer, although the area had been occasionally navigable with difficulty by ice breakers under optimum conditions.

The *Evergreen* departed Boston for Argentia on 8 July, arriving on 11 July and, after a conference with the U.S. Naval Oceanographic Office's Ice Forecasting Section, departed Argentia on 12 July for the Bonavista triangle. The *Evergreen* arrived at the first station, No. 8698, on 13 July and completed the triangle on 16 July with station 8727. On 17 July, data collecting on the Labrador Sea section was begun at station 8728. In addition to collecting temperature and salinity data, a total of 291 oxygen determinations were made for all depths excluding the surface using a modification of the Winkler method, and 314 samples were collected and frozen in 8-ounce polyethylene bottles for the later determination of inorganic phosphate, total phosphorus, nitrite, nitrate, and silicate content by the Woods Hole Oceanographic Institution. The Labrador Sea section was completed on 21 July with station 8749, two stations and 20 miles short of the desired goal because of heavy storms that extended 35 miles off the South Greenland coast.

The oceanographic work was under the supervision of oceanographer Alfred P. Franceschetti who was assisted by LCDR V. W. Driggers and LT R. M. O'Hagan. Other assistants in the observational work and reduction of data included R. C. Norris, aerographer's mate chief; P. R. Flowers and W. D. Eddowes, aerographer's mates, first class; R. A. Lindsay and J. A. Senefelder, aerographer's mates, second class; H. J. W. Daugherty and J. R. Blackwell, aerographer's mates, third class.

Temperature and salinity observations were made at each of the 363 stations. At the 22 stations included in the Labrador Sea section, the observations extended from the surface to as near the bottom as was practicable, utilizing NODC standard depths of observation as a guide. At the remaining stations, the observations were limited to the upper 1500 meters with the intended depths of observations in meters, at 0, 25, 50, 75, 100, 150, 200, 300, 400, 600, 800, 1,000, and 1,500.

Temperatures were measured with protected deep-sea reversing thermometers, mostly of Richter & Wiese manufacture, but with some manufactured by Negretti & Zambra, G. M. Manufacturing Co., and Kahl Scientific Instrument Corp. Depths of observation are based on unprotected reversing thermometers made by Richter & Wiese and by Kahl Scientific Instrument Corp. As in previous years, a program

of intercomparison of protected thermometers was carried out in the field measurements. The thermometers were used in pairs, and one of each pair was shifted periodically so that a given thermometer eventually was paired with a number of other thermometers. From a total of 3,036 intercomparisons, the standard deviation between the corrected readings of a pair of protected thermometers was $\pm 0.009°$ C. Of these comparisons, 2,735 involved thermometers having a range of $-2°$ to $+8°$, with a standard deviation of $\pm 0.009°$ C., 182 comparisons between thermometers of range $-2°$ to $+20°$ or greater gave a standard deviation of $\pm 0.013°$ C., and 119 comparisons were between thermometers with a range of $+3°$ to $+13°$ and gave a standard deviation of $\pm 0.007°$ C. As most of the observed temperatures listed in the Table of Oceanographic Data are means of the corrected readings of a pair of thermometers and, as many of the thermometers had recent ice point determinations, it is considered that the tabulated observed temperatures are good to $\pm 0.01°$ C.

As in the past years all salinities were measured with the Wenner salinity bridge with the exception of the surface water samples from stations 8728, 8757, and 8758, which because of their low salinities were measured on a Hytech inductive salinometer. In the field measurements, the bridge was standardized with sea water from an oil-sealed carboy. Copenhagen standard water of batch P36 was measured as an unknown twice during each salinity run. At the end of each survey, these measurements were used to correct the tentative value of the salinity of the oil-sealed carboy which had been used as a substandard of salinity and to determine the corrections to the salinities for the survey. The corrections indicated were as follows: First survey, $+0.01_{75}‰$; second survey, $+0.01_{5}‰$; third survey, $+0.02_{5}‰$; fourth survey, $+0.01_{75}‰$; and the postseason survey, $+0.00_{45}‰$. The corrections for the first four surveys are large because an incorrect Wenner bridge X-dial value for Copenhagen standard water was used.

Necessary corrections have been applied to the tabulated values appearing in the table of Oceanographic Data. Temperature control of the samples in the electrolytic cells of the Coast Guard's Wenner bridge limit the precision of the individual measurements to $0.00_{5}‰$. In view of the precise chlorinity determinations of February 1960 and the check runs on the calibration curve, it would appear that the salinities measured with Coast Guard Wenner bridge were measured with an accuracy of about $\pm 0.01‰$

In November 1963, in conjunction with salinity determination experiments for the U.S. Naval Oceanographic Office, salinity values were obtained that suggested that a new calibration curve be determined. The methods described on pages 34–37 of Bulletin 46 of this series were employed. A measured value of B, 200.2 ohms, and four

measured X-dial readings, m, for water of known salinity permitted deriving new values for A and C in the formula

$$S=\frac{A}{B+m}-C$$

This resulted in the following numercial expression:

$$S=\frac{9770.34692}{200.2+m}-4.07927$$

For a salinity of about 35°/₀₀, the new expression gives a salinity approximately 0.015°/₀₀ lower than the expression used at the beginning of the 1963 season. It would be difficult to say when this change had occurred and if it was a gradual or an abrupt change. Because of the uncertainty involved, no changes connected with this new curve have been made to 1963 data.

In Bulletin 48 of this series, mention was made of the acquisition and performance of one inductive salinometer constructed in Sydney, Australia. At the completion of the duplicate salinometer runs in September 1962, the instrument began a drift that is still uncorrected and that has rendered it nonoperational. In December 1962, four inductive salinometers manufactured by Hytech, San Diego, Calif., were received. Various of these were tested and used aboard both the CGC *Casco* and CGC *Evergreen*. When running warm water samples aboard *Casco* on station off Bermuda, no drift from bubbles was noted; however, when running cold water samples aboard *Evergreen* on station in the Labrador Current, many bubbles in the cell caused a drift. It was observed that when the Labrador Current (−1° C.) water came to equilibrium with the lab temperature (20° C.), many bubbles of dissolved gas formed on the interior walls of the citrate of magnesia bottles used to store the samples until run on the bridge. After shaking the bottle vigorously, there were no bubbles noticed in the cell to cause drift. There was so little change between the sea water temperature off Bermuda (18° C.) and lab temperature that such bubble effect was not present. There have been difficulties with either the electronic or mechanical sections of the salinometers and so, of the four, only three are presently operational.

Dissolved oxygen determinations were conducted as in 1961 and 1962 according to the method described by Jacobsen, J. P., et al.,[2] as modified slightly by the Woods Hole Oceanographic Institution. Samples for dissolved oxygen were taken at all levels except the surface from station 8728 through station 8749. Nansen-type water bottles with Teflon-coated interiors were used for all oxygen sampling. The samples were chemically treated and stored until analysis (storage

[2] Jacobsen, J. P., Rex J. Robinson, and Thomas G. Thompson. A review of the determination of dissolved oxygen in sea water by the Winkler method. Union Geodes. et Geophys. Int., Assoc. d'Oceanog. Phy., Pub. Scientif. No. 11, 1950.

time never exceeded 2 hours) in 150-milliliter glass bottles with ground and lapped glass stoppers. The sodium thiosulfate solution was standardized daily with a previously prepared potassium bi-iodate solution. Aliquot samples of the treated sea water were withdrawn by a 50-ml. automatic pipet and titrations were made with a 10-ml. microburette. The precision is generally considered to be ± 0.03 ml./liter.

The question mentioned in Bulletin 48 of this series regarding the validity of the oxygen solubility values of Truesdale, et al.,[3] still persists. Because of strong belief by many personnel of the Woods Hole Oceanographic Institution that more accurate values for solubilities may lie somewhere between those of Fox[4] and Truesdale et al., and presumably closer to Fox's the oxygen solubilities for the 1963 season were computed according to Fox. When comparing the percent saturation for 1963 with that for 1961 and 1962, consideration must be given the fact that the solubility values of Fox are higher and therefore the percent saturation will be lower.

Programs in Fortran for use on the digital computer of the Woods Hole Oceanographic Institution were prepared for computation of sigma-t, specific volume anomaly, dynamic height integration, for interpolation of salinity and temperature at standard depths, for determination of the amount of dissolved oxygen in milliliters per liter, for the computation of percent oxygen saturation based on Fox, for correction of reversing thermometers, and for determination of thermometric depths. Each of the above programs was used for data from the Labrador-Greenland section of the postseason survey with the exception of the dynamic height integration, which was used for data from the postseason Bonavista triangle.

Figures 20 through 24 show chronologically the dynamic topography found during the four surveys made during the season and the postseason occupation of the Bonavista triangle. As in past years the reference surface used was that of 1,000 decibars. The topography found during the first survey, figure 20, shows a Labrador Current that is well defined from section T, south along the eastward slope of the banks to the Tail of the Banks where it makes a westward turn, flowing across the deeper slopes of the Tail of the Banks. There is some slowing of the surface current as noticed by the spreading at the southeast corner of the Tail; however, the warmer temperatures at station 8409 offer no trace of Labrador Current water there. The Atlantic Current south of the Tail turns to the right as it approaches the shoaling bottom; northeast of the ridge it heads north at 42° N. but then veers to the east near 44° N. The mixed water found

[3] Truesdale, G. A., A. L. Downing, and G. F. Lowden. The solubility of oxygen in pure water and sea water. J. Appl. Chem. Vol. 5(2), pp. 53–62, 1955.

[4] Fox, C. J. J. On the coefficients of absorption of nitrogen and oxygen in distilled water and sea water and of atmospheric carbonic acid in Sea Water. Faraday Soc. Trans., Vol. 5, pp. 68–87, 1909.

between the Labrador and Atlantic Currents is relatively quiet with no unusual features.

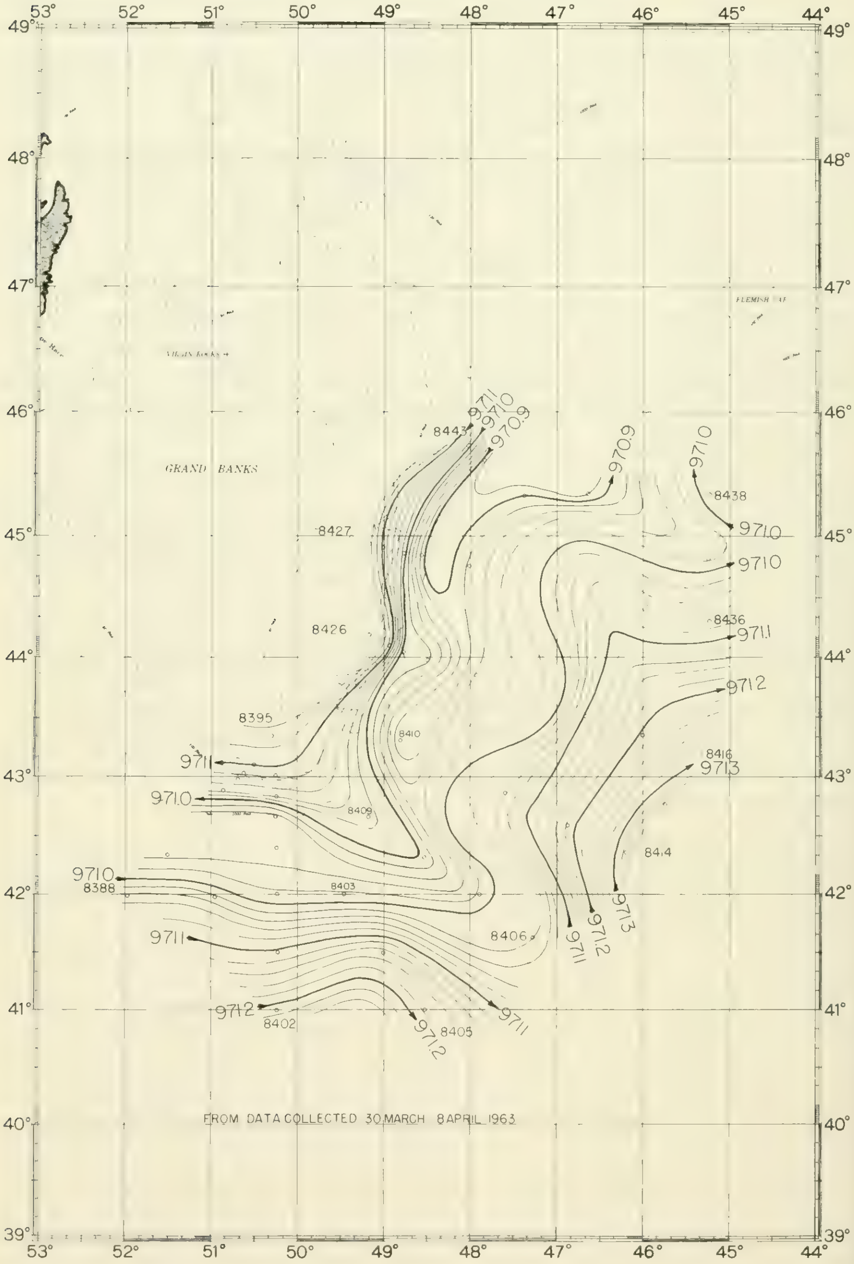

FIGURE 20.—Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected 30 March–8 April 1963. Oceanographic station positions are indicated and the station numbers given at turning points.

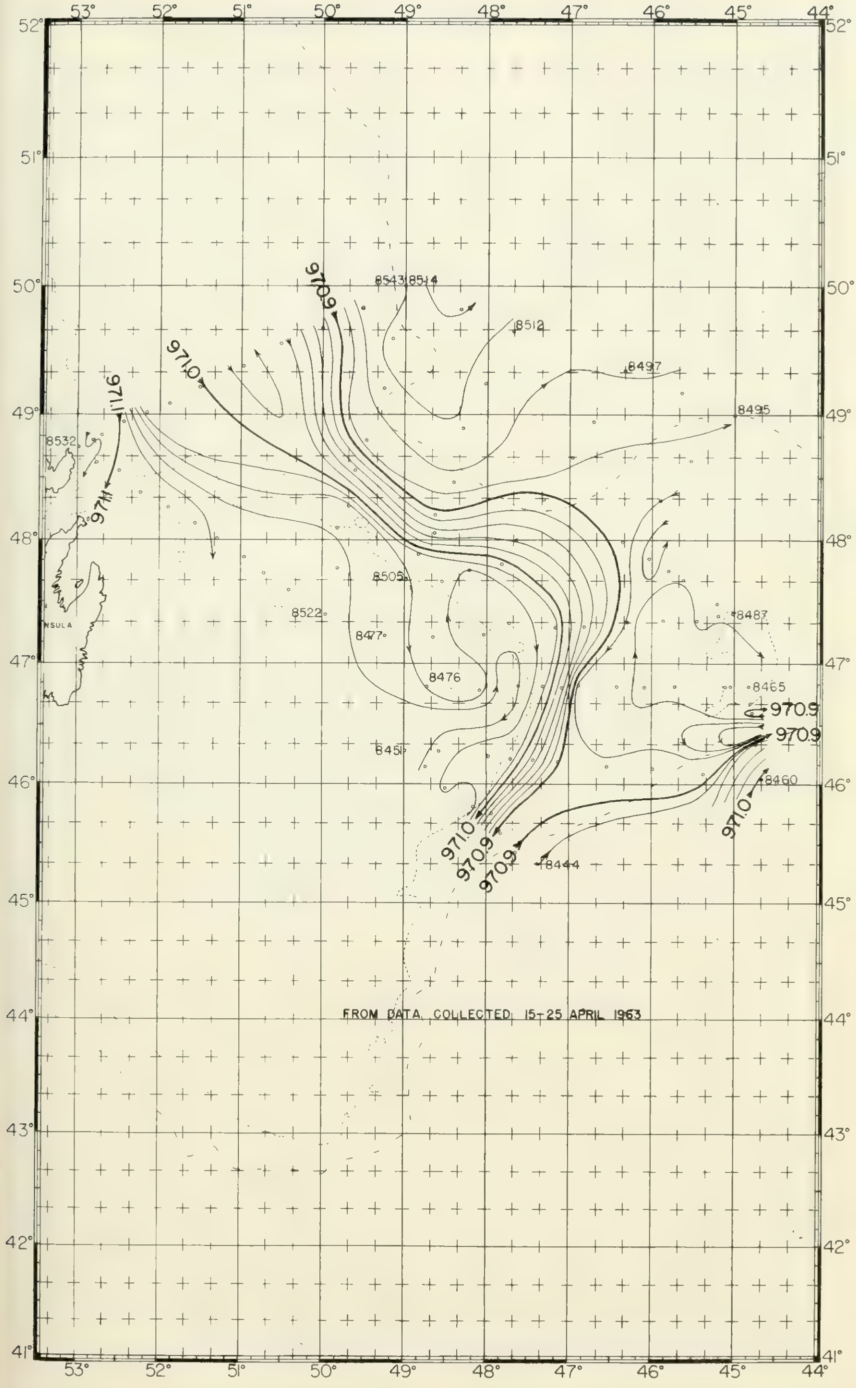

FIGURE 21.—Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected 15–25 April 1963. Oceanographic station positions are indicated and the station numbers given at turning points.

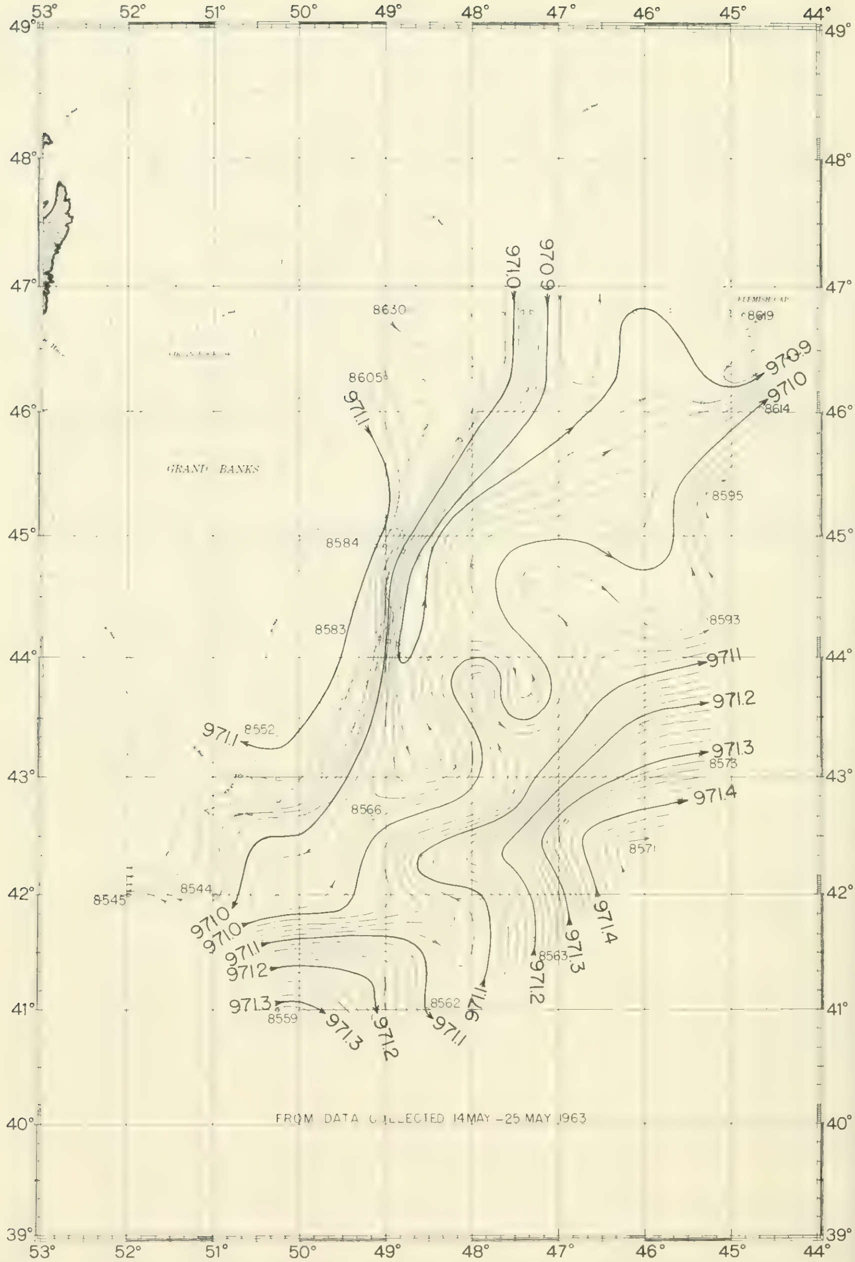

FIGURE 22.—Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected 14–25 May 1963. Oceanographic station positions are indicated and the station numbers given at turning points.

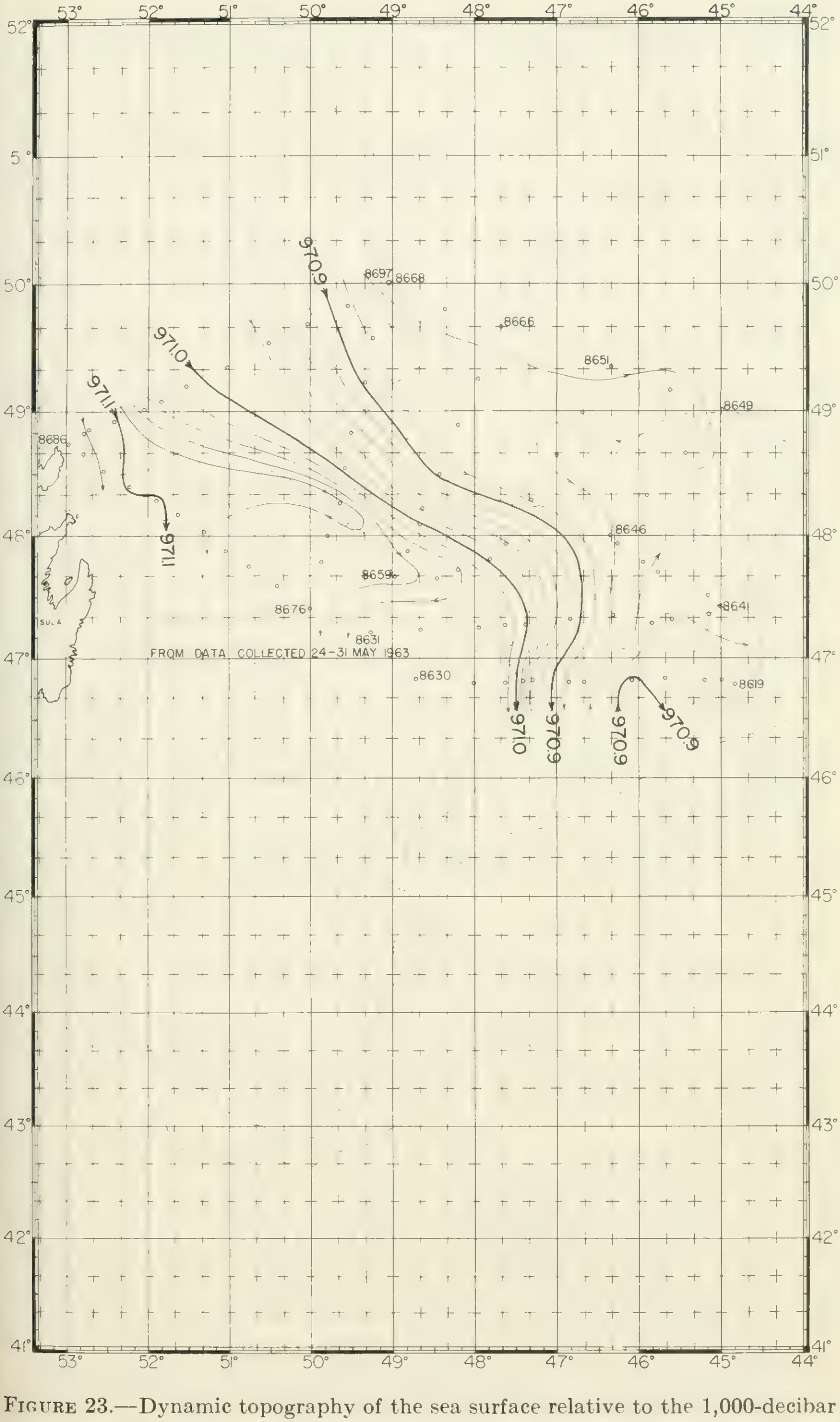

FIGURE 23.—Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected 24–31 May 1963. Oceanographic station positions are indicated and the station numbers given at turning points.

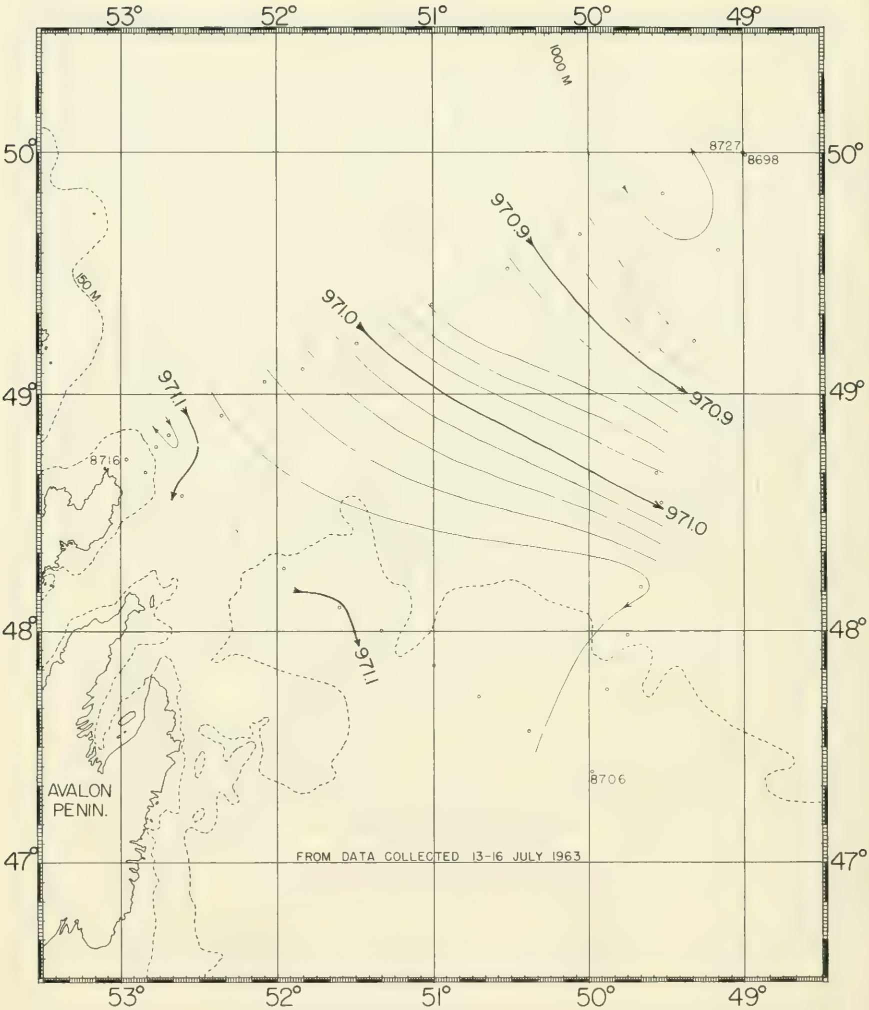

Figure 24.—Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected 13–16 July 1963. Oceanographic station positions are indicated and the station numbers given at turning points.

Figure 21, representing conditions found during the second survey, demonstrates a well-defined Labrador Current from the northwest leg of the Bonavista triangle southeastward to the northeast corner of the Grand Banks and then southwest along the eastern slope of the Banks. As the current moves southeastward across the Bonavista triangle, it becomes better defined until it reaches the 48th parallel where it curves to the eastward, expands gradually and makes a wide sweeping curve to the south, narrowing again at the easternmost boundary of the Grand Banks. There is some flow of very cold slow-moving Labrador Current water onto the Banks above the 48th

parallel. There are also some meanders of Labrador Current water on the northeast region of the Grand Banks and meanders of mixed water extending from the eastern edge of the Labrador Current to Flemish Cap and northward. Topographically there do not appear to be any abnormalities for this time of the year and there do not appear to be any atypical temperatures.

In figure 22, drawn from data collected during the third survey, the Labrador Current is found to be very well defined with only slightly diminished current velocities from those found during the first and second surveys. Labrador Current water now extends as far eastward as station 8568, farther westward onto the Banks, and farther south than during the first survey. The southerly deflection of the Atlantic Current water south of the Tail is more pronounced than previously. There is also considerable wandering of northward-flowing mixed water between 43° N. and 45° N. that was not previously present and Atlantic water velocities are higher than they had been. At stations 8596, 8613, 8615, and 8616, varying from 150 meters to bottom, T–S relationships hint at an intrusion of Labrador Current water, which may have reached this location via the northern and eastern slopes of Flemish Cap.

The dynamic topography found during the fourth survey is shown in figure 23. There appears to be little change between conditions found during the second and fourth surveys. The Labrador Current follows essentially the same path with slightly lower magnitudes. The dynamic topography shows little relief in the northeastern part of the area during both the second and fourth surveys, and considerably less relief in the area of Flemish Cap than was found during the second survey. Labrador Current velocities are slightly less than they were during the second survey.

Figure 24 represents the dynamic topography of the Bonavista triangle found during the postseason survey. The Labrador Current shows a remarkably simple pattern, with the greatest amount of water moving directly across the surveyed area from the northwest to the southeast with less meandering of Labrador Current water across the southwest leg of the Bonavista triangle onto the Banks than there was during earlier surveys of this year. The western branch of the Labrador Current represents a very small and minor portion of the current as a whole, and unless bergs were kept close inshore by easterly winds, they would probably be carried out over the slope of the banks by the main body of the current.

Labrador Current water and Atlantic Current water present in the Grand Banks region have characteristic temperature-salinity relationships that identify them as water masses. Usually the mixed water formed from these parent water masses has a sufficiently uniform proportion so that it can be regarded as a virtual water mass. The solid lines in figure 25 represent the 1963 T–S averages based on

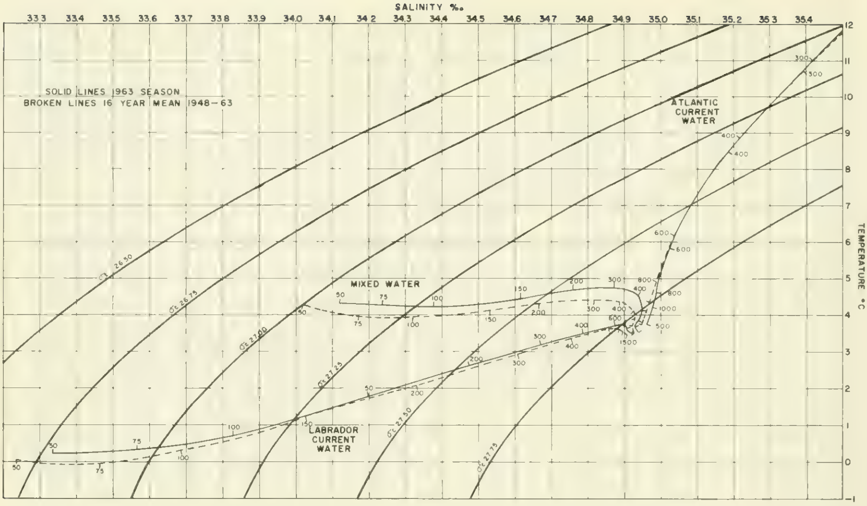

FIGURE 25.—Temperature-salinity relationships for Labrador Current water, Atlantic Current water and mixed water found in the Grand Banks region. Solid lines show conditions found during 1963 and broken lines represent the 16-year means.

observations made during the first, southern part of the second, and third surveys; the dashed lines illustrate the normals for the 16-year period 1948–63. As in 1962, the 1963 temperature minimum in the Labrador Current was located near 50 meters rather than the more normal depth of 75 meters. The Labrador Current was warmer and saltier than normal through the greatest depths examined (1,500 meters), resulting in slightly greater densities than normal. The Atlantic Current was colder than normal to 1,500 meters and fresher than normal to 800 meters; the resultant increase from normal of the densities was significant only below 400 meters. The mixed water was warmer than normal to 600 meters; the salinities and densities were greater than normal through 1,500 meters. On the third survey (May) the Atlantic Current was colder than the first survey (April) at the depths 100 to 600 meters.

Figure 26 shows the location of the section across the Labrador Sea occupied during the postseason survey and gives the dynamic topography of the sea surface in the vicinity of the section. It must be remembered that the fragmentary dynamic topography shown is not the result of a network survey and while having some support from GEK observations, it is principally useful in showing the location of the steeper gradients. It is interesting to note that in location, direction, and density, the dynamic topography of the Labrador Sea section has been fairly uniform through the years, although the West Greenland Current is much weaker in 1963.

In figure 27 the Labrador Current shows the usual characteristic temperature distribution with a negative temperature core over the

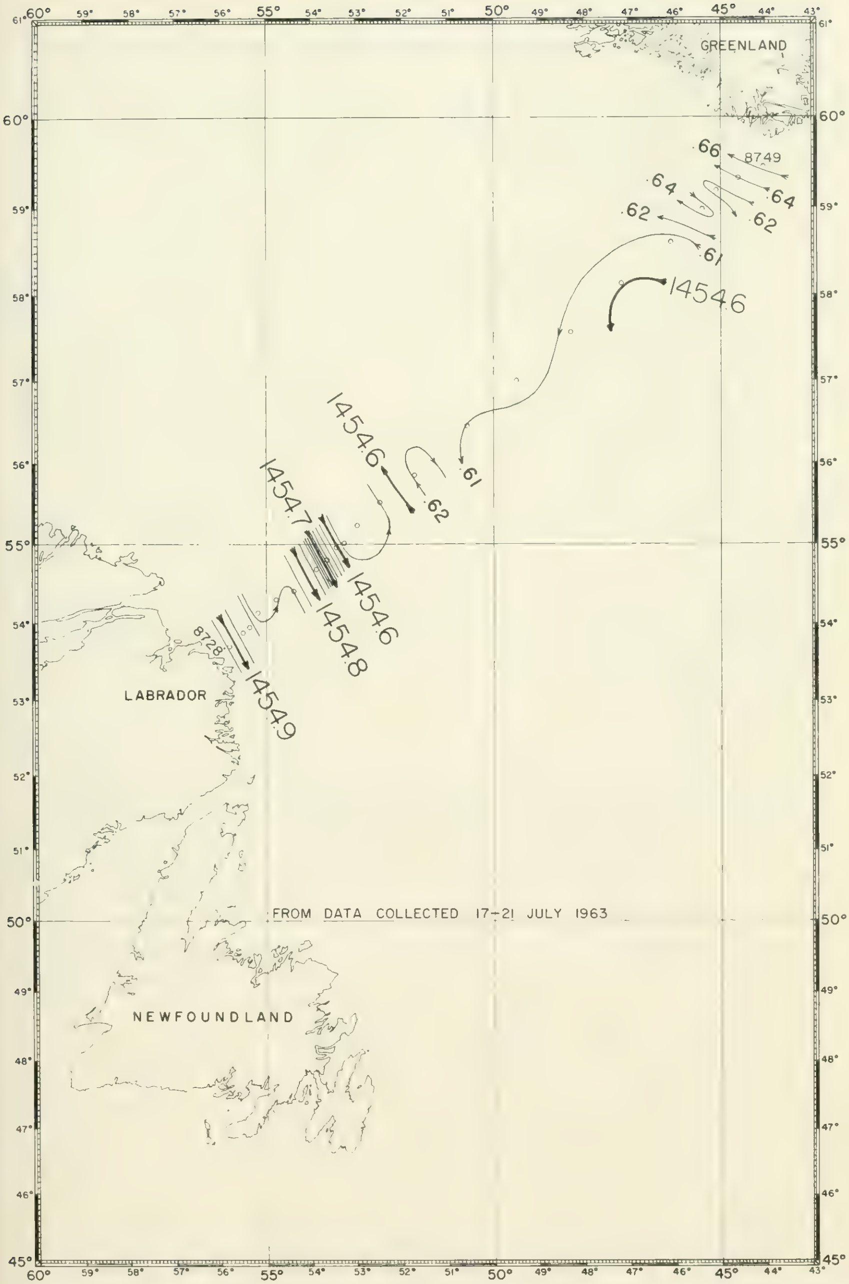

FIGURE 26.—Dynamic topography of the sea surface relative to the 1,500-decibar surface from data collected 17–21 July 1963. Oceanographic station positions are indicated.

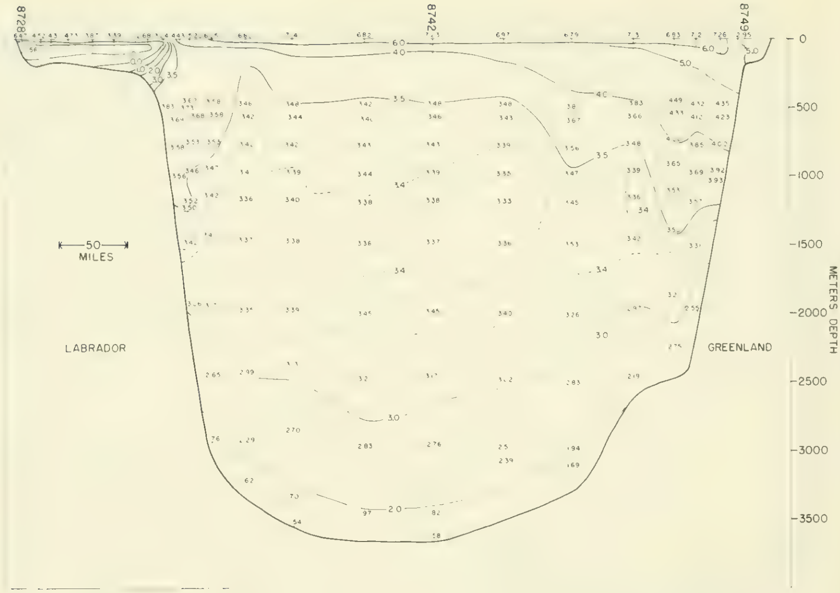

FIGURE 27.—Temperature distribution along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

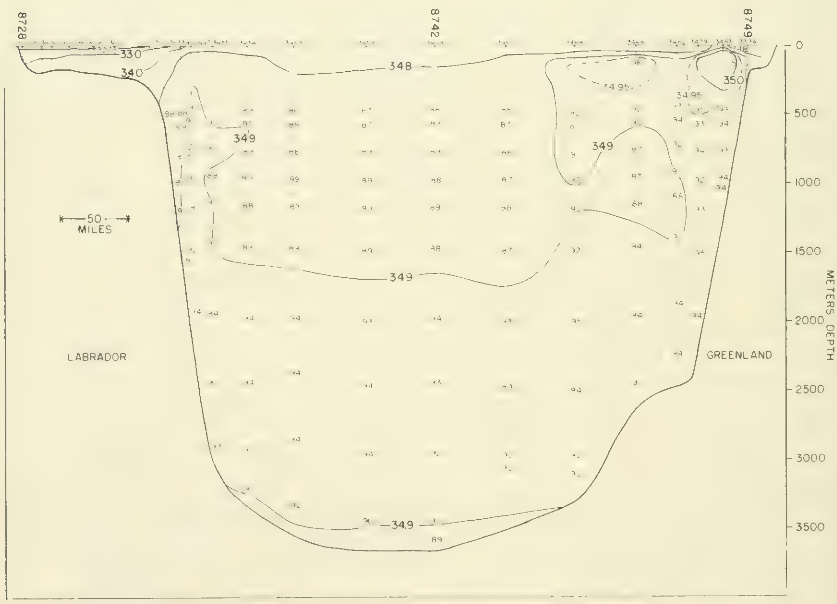

FIGURE 28.—Salinity distribution along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

Labrador Shelf, a steep horizontal temperature gradient over the continental slope and relatively warm water offshore. On the Greenland side the cold inshore component (3.2° mean) of the West Greenland Current, apparently closer inshore than normal, was barely sampled, since occupation of stations closer to shore was prohibited by sea ice. The Irminger component is marked by water warmer than 5°.

Isohalines over the Labrador Shelf show in figure 28 a characteristic slope with a graduation from the very low salinity coastal water to salinities greater than 34.80‰ over the continental slope. The 35.00‰ Isohaline outlines the core of the Irminger component of the West Greenland Current on the Greenland side, while a secondary high defined by the 34.95‰ isoline possibly represents a recurving of mixed water containing a high proportion of Irminger water.

Upon comparing dissolved oxygen content, figure 29, with salinity distribution, a vivid correlation, as in the 2 previous years, is noted between the salinity maximum and oxygen minimum at 2,000 to 3,000 meters. This is also reflected in the percent saturation distribution, figure 30. Again, as previously, the higher oxygen values are associated with the colder water masses.

An analysis of the temperature and velocity structure of the West Greenland Current showed a volume transport of 2.44×10^6 m^3/second as compared to the seasonal normal of 5.84×10^6 m^3/sec. The cold East Greenland component had a volume transport of 0.84×10^6 m^3/sec. as compared to a seasonal normal of 2.89×10^6 m^3/sec., and the warmer Irminger component had a volume transport of 1.60×10^6 m^3/sec. as compared to a seasonal normal of 2.95×10^6 m^3/sec. The mean temperature for 1963 was 4.71° C. as compared with the seasonal normal of 4.36° C. Heat transport calculated from temperature and volume transport was found to be 11.50×10^6 m^3 °C./sec. as compared with the seasonal normal of 25.47×10^6 m^3 °C./sec. The method of analysis is described in Bulletin 42 of this series.

In an attempt to characterize the intermediate water and deep water for an entire occupation of the section, averages have been taken for all observed temperatures and salinities from depths between 450 and 1,750 meters in the central part of the Labrador Sea and scaled values of temperature and salinity at all stations at levels of 2,000, 2,500, 3,000, and 3,500 meters. These values for the 1963 occupation of the section are given below in comparison with averages for the 16-year period 1948–63. As can be seen from the table, all temperatures, potential temperatures, and salinities were higher than average, with the exception of temperature and potential temperature at 3,500 meters. The number of observations made at the 3,500-meter level are limited and this should be taken into consideration when comparing these results with previous years.

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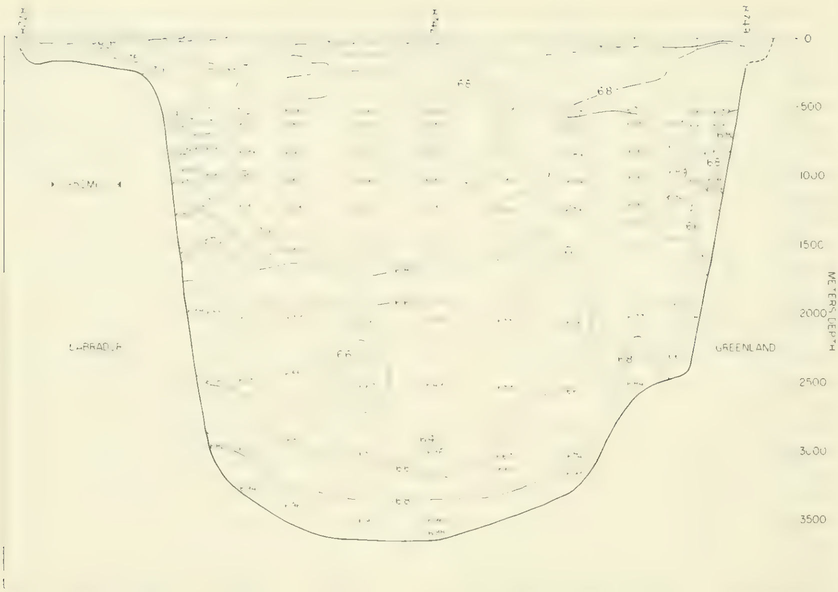

Figure 29.—Distribution of dissolved oxygen, in ml/l, along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

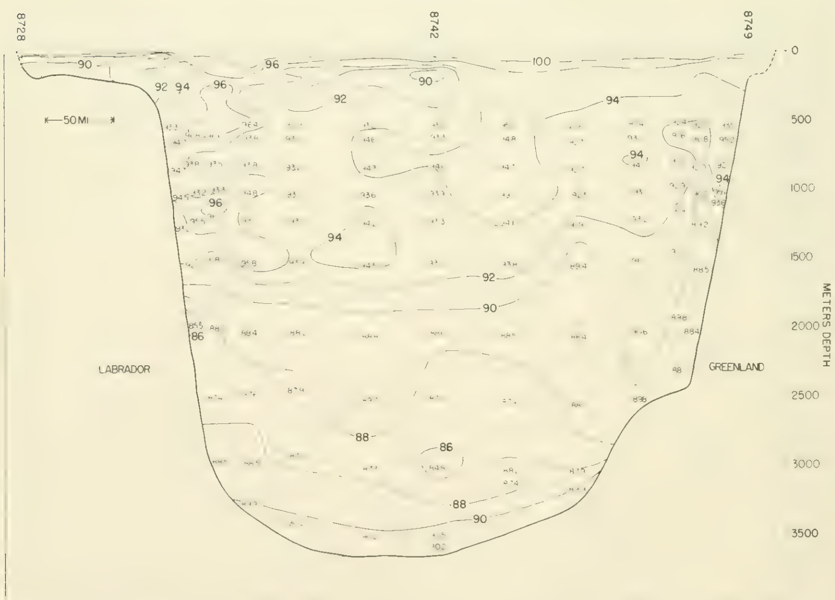

Figure 30.—Distribution of dissolved oxygen, in percent saturation, along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

	Temperature		Potential temperature		Salinity	
	1963	Average	1963	Average	1963	Average
Intermediate water	3.43_7	3.33_4	----------	----------	34.88_8	34.87_0
2,000 meters	3.38_3	3.20_9	3.22_0	3.04_9	34.93_8	34.92_0
2,500 meters	3.02_5	2.89_0	2.81_8	2.68_7	34.93_0	34.92_4
3,000 meters	2.44_2	2.41_4	2.19_7	2.16_7	34.92_7	34.91_6
3,500 meters	1.78_6	1.90_6	1.50_1	1.61_9	34.90_7	34.90_3

Operational requirements permitting, dynamic topographic surveys have been made so as to include the reoccupation of certain sections across the Labrador Current from South Wolf Island, Labrador, to the southern slope of the Grand Banks. For each such occupation the temperature and velocity structure of the Labrador Current have been examined and the volume transport, mean temperature, minimum observed temperature, and heat transport have been recorded. As the data have accumulated, estimates of tentative normal seasonal variation relationships have been made and published from time to time. The location of these sections, their designations and the most recently published tentative normals can be found in Bulletin No. 48 of this series.

The term "heat transport" as used by the CG Oceanographic Unit is the product of in-situ temperature and volume transport obtained from the summation of products of elemental graphically determined areas of cross section enclosed between two isotherms and two lines of equal velocity multiplied by the average velocity in the enclosed area and by the average temperature in the enclosed area. The first two factors give an elemental volume transport and their summation gives a figure for the volume transport across the section. For the measurement of small areas, a figure for the mean temperature is obtained by dividing the summation of area times velocity times temperature by the summation of area times velocity in an effort to reduce planimeter errors. The figure for mean temperature thus obtained is then used to multiply the best value of volume transport to obtain the heat transport.

A summary of the results of the analyses of the data obtained from the 1963 season and postseason reoccupation of sections across the Labrador Current for which tentative seasonal normals have been published is found in table VIII, and the volume transports have been shown schematically in figure 31. Volume transports are given in millions of cubic meters per second, mean, and minimum observed temperatures in degrees C., and heat transport in millions of cubic meter degrees C. per second.

Sections T, U, and W, located south of the latitude of Flemish Cap, showed a characteristic volume transport decrease as the season advanced, with sections U and W above normal for the entire season

Table VIII. Summary of Velocity Sections Across the Labrador Current Occupied in 1963

	Volume transport 10^6 m^3/sec.			Mean temperature ° c			Minimum observed ° c			Heat transport 10^6 m^3 ° c/sec.		
	1963	Normal	Anomaly	1963	Normal	Anomaly	1963	Normal	Anomaly	1963	Normal	Anomaly
1st survey:												
U	6.62	5.30	+1.32	1.00	1.40	−0.40	−1.17	−1.28	+0.11	6.64	7.42	−0.78
W	5.31	3.89	+1.42	1.83	1.83	±.00	−.80	−.34	−.46	9.73	7.12	+2.61
2d survey:												
NW	3.81	3.54	+.27	.47	.63	−.16	−1.72	−1.64	−.08	1.81	2.23	−.42
SW	.80	.43	+.37	−1.09	−1.06	−.03	−1.73	−1.60	−.13	−.87	−.46	−.41
SE	4.19	3.45	+.74	1.78	1.60	+.18	−1.69	−1.30	−.39	7.45	5.52	+1.93
H	2.73	3.64	−.91	.84	1.06	−.22	−1.70	−1.43	−.27	2.28	3.86	−1.58
G	2.19	3.76	−1.57	1.00	1.51	−.51	−1.70	−1.41	−.29	2.19	5.68	−3.49
F2	2.83	2.66	+.17	1.50	1.23	+.27	−1.71	−1.15	−.56	4.24	3.27	+.97
F	2.55	3.15	−.60	.43	1.49	−1.06	−1.64	−1.10	−.54	1.09	4.69	−3.60
T	2.74	3.24	−.50	1.04	1.61	−0.57	−1.38	−1.28	−.10	2.85	5.22	−2.37
3d and 4th:												
NW	3.76	3.74	+.02	.97	.98	−.01	−1.52	−1.64	+.12	3.64	3.67	−.03
SW	.71	.53	+.18	.09	−.47	+.56	−1.61	−1.60	−.01	.07	−.25	+.32
SE	3.50	3.58	−.08	1.88	1.84	+.04	−1.55	−1.38	−.17	6.56	6.59	−.03
H	3.18	4.06	−.88	1.75	1.83	−.08	−1.48	−1.29	−.19	5.56	7.43	−1.87
G	3.66	3.55	+.11	2.47	1.49	+.98	−1.48	−1.29	−.19	9.03	5.29	+3.74
F2	3.40	2.81	+.59	2.33	1.84	+.49	−1.28	−1.18	−.10	7.92	5.17	+2.75
F	2.91	3.24	−.33	2.18	1.88	+.30	−1.21	−1.24	+.03	6.36	6.09	+.27
T	2.57	2.88	−.31	2.15	1.85	+.30	−1.34	−1.33	−.01	5.51	5.33	+.18
U	4.48	4.16	+.32	1.80	2.07	−.27	−.64	−1.08	+.44	8.08	8.61	−.53
W	3.59	3.36	+.23	2.01	2.82	−.81	−.30	−.43	+.13	7.21	9.48	−2.27
Postseason:												
NW	3.34	3.99	−.65	1.94	1.43	+.51	−1.47	−1.63	+.16	6.49	5.71	+.78
SW	.26	.65	−.39	1.56	.27	+1.29	−1.46	−1.61	+.15	.40	.18	+.22
SE	3.32	3.75	−.43	2.46	2.16	+.30	−1.32	−1.49	+.17	8.16	8.10	+.06
South Wolf Island	5.50	4.96	+.54	2.30	2.45	−.15	−1.56	−1.52	−.04	12.68	12.15	+0.53

and section T below normal. Section H showed a characteristic increase, but was well below normal for the season.

Sections G, F2, and F showed an increase in volume transport as the season progressed, with section F below normal for the season, section G going from below normal to above normal, and section F2 above normal for the entire season. There was a decrease in volume transport across the Bonavista triangle as the season progressed, with above normal transport at the beginning of the season which gradually decreased to a below normal flow at the end of the season. Characteristically the volume transport, for the entire season, leaving the Bonavista triangle through sections SW and SE, was greater than that entering through section NW. The Labrador Current volume transport in the vicinity of South Wolf Island, Labrador, was above normal in July.

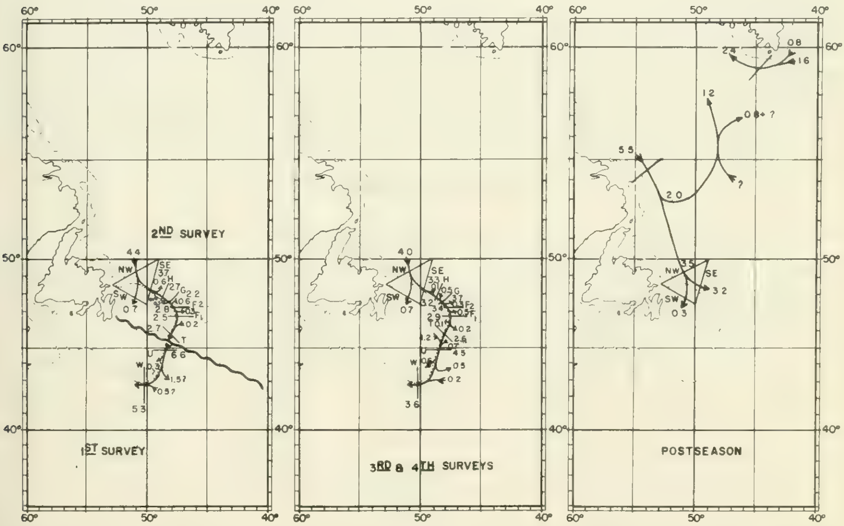

FIGURE 31.—Schematic representation of circulation deduced from sections occupied in 1963. Numerals indicate volume transport in units of $m^3 \times 10^6$/sec.

During the first part of the season, mean temperatures were below normal, with the exception of sections SE and F2, and minimum observed temperatures were all well below normal except for section U. The latter part of the season showed an overall warming trend with higher mean temperatures and with some above normal and some below normal. The influx of warm water below the latitude of Flemish Cap was very apparent from the figures, although minimum observed temperatures remained predominantly below normal. During the postseason Bonavista triangle occupation, the Labrador Current volume transport had diminished to below normal, and both mean temperatures and minimum observed temperatures were

above normal for all sections. Since the heat transport is the product of volume transport and mean temperature, the picture derived from inspection of the table is not clear cut.

SUMMARY

1. Five dynamic topographic charts resulting from the four surveys made in the Grand Banks region during the season and the post-season occupation of the Bonavista triangle have been presented.

2. The temperature-salinity relationships in the different water masses found in the Grand Banks region in 1963 have been discussed and compared with the average relationships for the 16-year period 1948–63.

3. The volume and heat transports and mean and minimum observed temperatures found during the reoccupation of sections across the Labrador Current in 1963 have been compared with tentative seasonal normal values.

4. The circulation at all levels across the Labrador Sea section has been discussed concerning the distribution of temperature, salinity, oxygen, volume, and heat transport observed during the 1963 post-season survey.

ACKNOWLEDGMENT

The authors wish to express their appreciation to Mr. Floyd M. Soule for his helpful comments and suggestions during the preparation of this bulletin. Mr. Soule, who has been the senior author of this series since 1933, retired on 1 August 1963.

THE DISTRIBUTION OF NUTRIENTS IN THE LABRADOR SEA, SUMMER 1963[1]

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For the second year, determinations of nutrient concentrations have been made from samples obtained during the annual postseason cruise of the International Ice Patrol between Labrador and Greenland. The results greatly augment the information available on the chemical characteristics of the area, since some comparisons with previous data are possible. Some evidence of annual differences in the amount of deep water formation is discussed.

METHODS

Sea water samples were collected on stations of the USCGC *Evergreen* and stored in deep-freeze lockers for the duration of the cruise. The analyses were conducted by the authors at the Woods Hole Oceanographic Institution with the assistance of Mr. John Schilling and Mrs. Juanita Mogardo. Determinations of the total phosphorus, nitrate- and nitrite-nitrogen and the silicate-silicon followed techniques described in a previous report (Corwin and McGill, 1963). The inorganic phosphate determinations were made by the use of an acidic molybdate solution containing ascorbic acid to reduce the phospho-molybdic complex in the presence of antimony tartrate for more rapid color development (Murphy and Riley, 1962). This method replaces the stannous chloride reduction used previously. The ascorbic acid method is considered to be more reliable, since the molybdenum blue color formed is stable for long periods. Comparison of the various existing techniques of phosphorus determination, made by Jones and Spencer (1963) and others, suggests that the ascorbic acid method is especially dependable at very low concentrations.

Distribution profiles for the data on the section from South Wolf Island, Labrador, to Cape Farewell, Greenland, are presented for the significant nutrient quantities. In these figures the area of maximum concentration for each parameter is shaded.

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[1] This work has been supported in part by the Office of Naval Research under contract Nonr-2196(00)NR. 083-004. Contribution No. 1457 from the Woods Hole Oceanographic Institution.

DISTRIBUTION OF NUTRIENTS

The deep water distributions of the inorganic phosphate and total phosphorus show that the highest concentrations occur within the central Labrador Sea basin away from the coastal shelves and extend vertically throughout nearly the total extent of the water column. Values of inorganic phosphate greater than 1.0 μgA/l are shown by shading in figure 32. Some maximum values in excess of 1.1 μgA/l can be noted at middepths near the western end of the section. Values across the section begin at about 0.5 μgA/l at the surface and increase rapidly through the euphotic zone to the highest concentrations observed, starting at depths from 100 to 300 meters. On the Labrador Shelf the concentrations are 0.1 to 0.2 μgA/l higher than for the same area near Greenland. A similar distribution is seen in the total phosphorus concentrations reported in figure 33. The highest concentrations obtained are 1.4 μgA/l in the west and 1.3 μgA/l in the east at depths of 500 to 800 meters. These maxima, shown in figure 33 by the progressive shading of all concentrations greater than 1.1 μgA/l, extend to depths near 2,000 meters. Surface concentrations on the coastal shelves are reduced, with the lowest values for the near-surface depths occurring near Greenland.

From the difference between the total phosphorus and the inorganic phosphate levels, the concentration of the total organic phosphorus

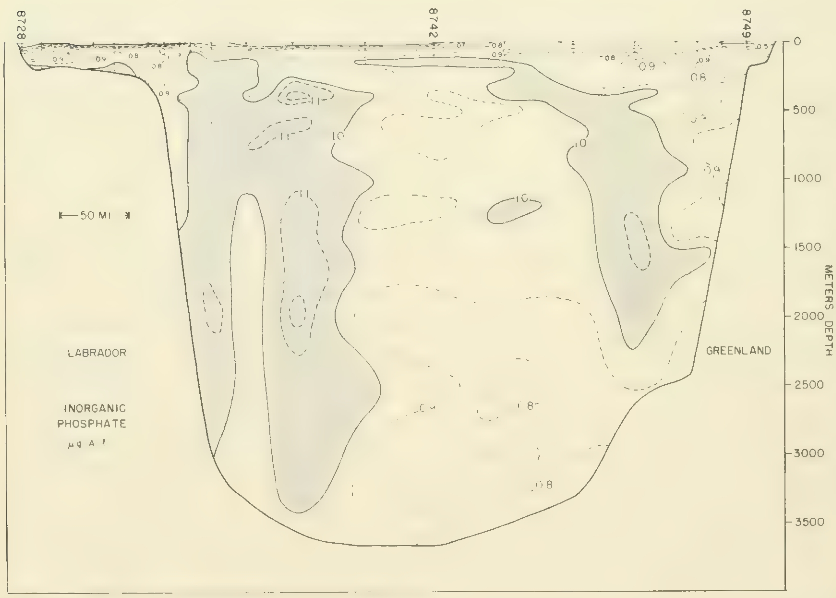

FIGURE 32.—Distribution of inorganic phosphate as PO_4-P in μgA/l, along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

FIGURE 33.—Distribution of total phosphorus in μgA/l along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

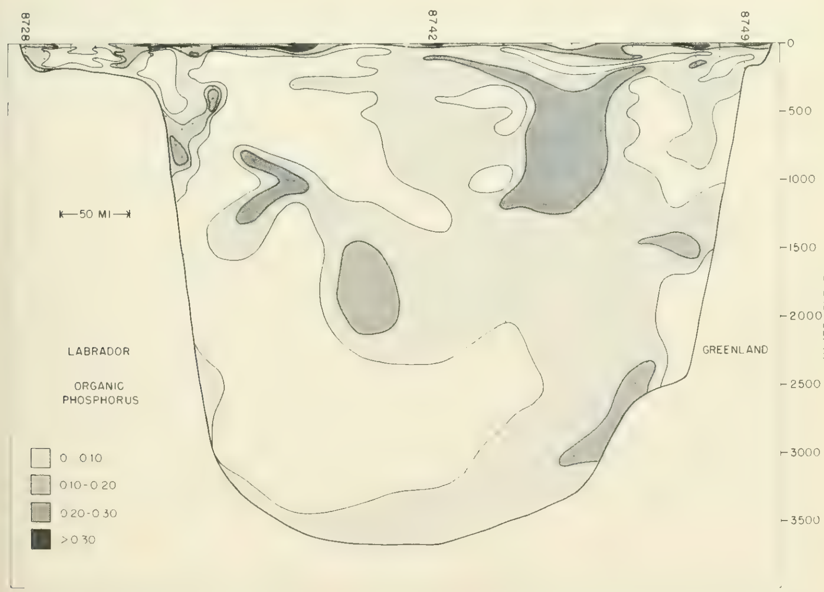

FIGURE 34.—Distribution of organic phosphorus μgA/l along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

FIGURE 35.—Distribution of silicate as SiO_3-Si in μgA/l along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

FIGURE 36.—Distribution of nitrate as NO_3-N in μgA/l, along section between South Wolf Island, Labrador, and Cape Farewell, Greenland, from data collected 17–21 July 1963.

can be determined. The distribution of organic phosphorus is shown in figure 34, which indicates that the eastern half of the basin has a higher level throughout the water column than the western half. The middepth maximum near station 8744 coincides with the previously noted high inorganic and total phosphorus levels in this area. Limited high concentrations near the surface in the western shelf and slope region of the basin are presumably related to the presence of the Labrador Current in this area. An organic phosphorus value of more than 0.1 μgA/l extends across the bottom of the basin. A statistical analysis of the observed concentrations of organic phosphorus for 1962 and 1963 is presented in the following section.

The distribution of silicate-silicon, as shown in figure 35, has a basic similarity with the phosphorus distribution. Values greater than 9 μgA/l occur in the same areas and depths as the phosphorus maxima. At the western side of the basin, two separate high silicate concentrations in deep water are shown in shading, separated by an area of lower concentration. This pattern is closely similar to the deep water phosphorus distribution which also shows two separate areas of high concentration near the Labrador slope. There is a high silicate concentration near the Greenland slope, but the values are slightly lower than those found in the western area. The central portion of the deep water shows a concentration as low as 3 μgA/l.

The same general pattern of high and low concentrations is observed in figure 36 which presents the nitrate-nitrogen distribution. The high concentrations of more than 15 μgA/l occur along the eastern and western margins of the deep Labrador basin. On the western side, two separate areas of high concentration in the deep water are seen in the same position as the high silicate and phosphate deep water values. The central area of the Labrador basin shows low nitrate concentrations throughout the water column. Values on the coastal shelves are also reduced and, as with the other properties, the eastern slope and shelf is lower in concentration than the western region. A significant amount of nitrite-nitrogen, with values greater than 0.1 μgA/l, was found only in the surface region, to a depth of about 200 meters. The coastal region near Labrador and just off the shelf showed the highest nitrite values of 0.3 μgA/l, and a few values of 0.2 μgA/l were found near Greenland, both at about 100 meters. It has been suggested by Vaccaro and Ryther (1960) that the nitrite maximum is correlated with a large phytoplankton standing crop.

DISCUSSION

The results from the 1963 postseason cruise of the Ice Patrol show a general consistency and agreement between the various parameters. High nutrient levels at 300–800 meters are confined to two areas on the eastern and western fringes of the central basin. It has been noted by Steeman-Nielsen (1958) and Hansen (1959) that the areas

with a high rate of primary production in the Labrador Sea occur where fronts between two water systems are found—specifically at the fronts on both sides of the Irminger Current off east and south Greenland and "the front between the Labrador Polar Current and the subarctic water in the western part of the Labrador Sea" (Hansen, 1959, p. 309). The surface productivity is indirectly indicated by the nitrite distribution previously mentioned. Gillbricht (1959) has estimated from turbidity measurements in the Irminger Sea that 40 percent of the turbidity in surface waters is due to living plankton and 60 percent to detritus. Regeneration of the detrital material would lead to the high subsurface nutrient concentrations seen in figures 32 through 36. The exchange is a dynamic one, since Steeman-Nielsen (1958) considers that the surface production, in turn, is stimulated by the formation of eddies bringing nutrient-rich water to the surface. It is noteworthy that the coastal currents show reduced nitrite concentrations and that the available productivity measurements indicate lower levels on the coast and in the center of the basin than near the fronts (Hansen, 1959). The pattern of the high near-surface nutrient concentrations can therefore be used as a general indicator of the boundaries of surface water masses across the section.

High nutrient concentrations in deep water represent a different water-mass source. Smith, Soule, and Mosby (1937, p. 192) have presented the hypothesis that the bottom water of the North Atlantic Ocean is formed in winter by the chilling and sinking of the surface waters in the north-central Atlantic Ocean proper. This southward-flowing deep water follows the Labrador slope. We suggest that this flow is marked by the prominent nutrient concentrations occurring as distinct high values in the deep water on the western edge of the Labrador basin. An influx of Atlantic water from the Irminger Sea is required to compensate for the loss of the deep water. Kalle (1957) has shown high phosphorus concentrations extending to depths of 1,500 D-meters near the mid-Atlantic ridge in his sections to the east of Greenland. It is also possible that some of the deep water nutrient concentrations represent continuing decomposition, although the separation of the deep water concentrations as discrete entities suggests a reasonable distinction in the sources providing them.

The formation of deep water is generally considered an annual process, with some variation in magnitude from year to year. In contrast to the well-defined pattern that can be constructed from the nutrient distribution data for 1963, observations of the previous year were much less striking. Distribution profiles for inorganic phosphate, nitrate-nitrogen and silicate-silicon may be compared. (See Corwin and McGill, 1963.) Much more diffuse patterns of distribution will be noted for summer 1962, with the widespread

high concentrations showing no apparent divisions that can readily be ascribed to circulation. Values for the highest concentrations of inorganic phosphate were slightly greater in 1962, while the concentrations of nitrate and silicate remained about the same in each year but show a more restricted distribution in 1963.

Weather ship *Bravo* is located near the midpoint of the Labrador-Greenland section (56.5° N., 51.0° W.) and its daily reports may be used to provide information on the variation in seasonal weather conditions in the Labrador Sea. Data on air and sea temperatures, windspeed and wind direction have been taken from the Northern Hemisphere data tabulations, part II of the synoptic weather maps published daily by the U.S. Weather Bureau. Reduced to mean monthly averages, the sea surface temperatures for January through March of 1963 are lower than for the same period in 1962, as shown in table IX.

Table IX. Mean Monthly Sea Surface Temperatures, From Daily Reports of Weather Ship "Bravo" (56.5° N., 51.0° W.)

[In °C.]

	1962	1963	Difference 1962–63
January	3. 53	3. 28	−0. 25
February	3. 23	2. 89	−0. 34
March	3. 06	2. 72	−0. 34

Observations at this latitude in February 1962, made by L. V. Worthington on the *Erika Dan* under charter to the Woods Hole Oceanographic Institution, show a surface salinity of about 34.79. Assuming the same pressure and salinity conditions for 1963, the lower average sea surface temperature would give a change in density from 27.70 (for 1962) to 27.74 (for 1963). It is suggested that this increased density at the surface results in a reduced stability, thus promoting more sinking from the surface and increased formation of North Atlantic deep water in the area.[2] Wind observations from weather ship *Bravo* do not indicate any significant difference in either windspeed or direction for this period in the 2 years. It must be acknowledged, however, that conditions still farther north for which data are unavailable would be of yet more importance in producing the water-mass structure seen on this Labrador-Greenland section itself.

The level of organic phosphorus, which is estimated from the difference between the total and the inorganic phosphorus, can be statistically compared for various levels of the water column by grouping in a frequency distribution by depth intervals. The number of determinations (n), the mean value ($\bar{x}$), variance (s^2), standard deviation (s), and standard error of estimate ($s/\sqrt{n}$) for 1,000-meter

[2] The relative stability may be given as $\Delta\sigma_t \times 10^5/\Delta D$ (in meters). For the present purpose, it may be assumed that there was no change in either year for the deeper water density to which the surface value is compared.

Table X. Comparison of Organic Phosphorus values (μgA/l) for Selected Depth Levels in Observations Between Labrador and Greenland in 1962 and 1963

	Depth intervals in meters				Total below 1,000 m.
	0–999	1,000–1,999	2,000–2,999	3,000–3,999	
Summer 1962					
n	150	20	13	4	37
$\bar{x}$	0.1403	0.1000	0.0769	0.0500	0.0865
s^2	.0329	.0214	.0253	.0062	.0201
s	.1814	.1463	.1561	.0787	.1418
$s/\sqrt{n}$	.0148	.0327	.0441	.0393	.0233
Summer 1963					
n	235	31	19	8	58
$\bar{x}$	0.1513	0.1242	0.0895	0.1563	0.1172
s^2	.0289	.0156	.0124	.0240	.0151
s	.1700	.1249	.1112	.1548	.1228
$s/\sqrt{n}$	.0111	.0224	.0262	.0547	.0161

portions of the water column are given in table X. In addition, all the depths below 1,000 meters are combined to obtain a value for comparison with the surface (0–1,000 m.) interval. Values for both 1962 and 1963 are given. The only significant difference occurs in the bottom depth interval, below 3,000 meters. The greatly increased value in 1963 is shown in figure 34 to be due mainly to conditions on the eastern side of the basin. At levels near the surface, the organic phosphorus distribution is little altered in the 2 years, especially when the range of the standard error is considered. These observations represent presumably the high levels of organic productivity during the summer. The data may be compared to similar values for the eastern and western North Atlantic at more southern latitudes (McGill, 1964).

Information on the relative abundance of the inorganic nutrients can be obtained from a comparison of the reported concentrations. A least squares regression for the 1962 data gives the following general ratios by atoms for the relative changes in concentration within the total water column:

$$\Delta N:\Delta Si:\Delta P=18.2:17.5:1.$$

This is close to the general average for these ratios of change in sea water, which has been given by Richards (1957) as:

$$\Delta N:\Delta Si:\Delta P=16:16:1.$$

A similar determination for the data from 1963 results in ratios of:

$$\Delta N:\Delta Si:\Delta P=26.5:11.8:1.$$

Such ratios describe the biological effects of both assimilation and regeneration, assuming that mixing processes have not obscured or modified the conditions. No direct observations of the biological conditions are available for further interpretation of the pattern

presented or the variation between the two sets of available observations.

SUMMARY

Distribution patterns for organic, inorganic, and total phosphorus, nitrate- and nitrite-nitrogen and silicate-silicon are discussed for the Labrador-Greenland section in 1963. The position of the high subsurface nutrient concentrations corresponds with conditions of the surface circulation, while a distinct deep water maximum is tentatively correlated with the presumed formation of North Atlantic Deep Water in the area. The ratios of change between the parameters analyzed are calculated and a comparison of organic phosphorus levels for 1963 and 1962 is made.

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Appendix 1

PERMEABILITY OF POLYETHYLENE BOTTLES TO SEA WATER

General. The Coast Guard Oceanographic Unit collected, in polyethylene bottles, sea water samples from the Davis Strait-Baffin Bay area in late July 1962 and made salinity determinations of these samples in late September, after 2 months' storage. (See Bulletin No. 48 of this series.)

R. A. Cox (1954), using pure water, has shown polyethylene to be permeable to water, whereas V. Romanovsky (1954), using sea water, indicated that the permeability was to the solution. Another consideration is that thermal expansion or contraction within the bottle caused by ambient temperature changes results in a pressure differential on the bottle walls. In addition, osmotic pressure may cause a transfer of water if the exterior of the bottle were contaminated by salt, as usually occurs in the field. Under such conditions condensation of atmospheric moisture at temperatures below the dewpoint or deliquescence of the contaminating salts are mechanisms for forming droplets to produce the solutions on the exterior of the bottle, whose wall may be considered a semipermeable membrane. In veiw of this latter consideration and the opposing conclusions by Cox and Romanovsky regarding the salinity change of samples stored in polyethylene bottles, further similar observations were made under varied conditions.

Experimental. Fifteen polyethylene bottles of approximately 250-ml. capacity, with a shape similar to that described by Romanovsky, were filled to just below the neck from a common sea water source and then set aside in three groups. At the same time, three glass citrate of magnesia bottles (approximately 350 ml.), the type normally used for salinity samples by this Unit, were filled from the same source.

Group 1. The outside of six of the polyethylene bottles were contaminated with the fill water and were then allowed to sit unprotected (with lids screwed tight), subject to the ambient temperature and pressure. This procedure most nearly duplicated field collection and storage conditions.

Group 2. The exterior surfaces of three polyethylene bottles were carefully cleansed to remove all contamination. After filling, the bottles were placed in a dry bottle sterilizer with a tight-fitting lid

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to seal them from further contamination. These bottle outsides were later to be washed, and the wash water was to be analyzed for salinity, hopefully to reveal if salts were being passed through the walls and were collecting on the outside.

Group 3. The remaining six polyethylene bottles were stored in a second sterilizer, immersed in tap water to the same level as the liquid in the bottle and covered with a tight-fitting lid. This is the extreme case of water condensation simulation and was to indicate if water crosses into the bottle from osmotic pressure.

The bottles in group 1 were washed, inside and outside, with sea water and the exteriors were allowed to dry by natural evaporation. The bottles from groups 2 and 3 were washed thoroughly on their outsides with tap water and then with distilled. One bottle from group 2 was also washed on its inside and then filled with distilled water. This was placed in an 800-ml. beaker containing distilled water to the level of the water on the inside of the bottle. The bottle was agitated, allowed to soak 10 minutes, then agitated again. The wash water was run on a Woods Hole Oceanographic Institution flame photometer (Spencer and Woodcock, 1963) to determine if there was any sodium and thus any residual salts on the outer surface prior to filling the inside with sea water.

The polyethylene bottles were weighed empty (with caps) after washing and then weighed again after filling with sea water. All weighings except the final ones at $t=232$ days were done on a torsion balance scale; the exceptions were weighed by a Mettler Type K–7 scale. An inter-comparison was made between the two types of scales to determine the corrected value for the final weighings. The accuracy of the weighing is considered to be ± 10 mg.

The polyethylene bottles exposed to the atmosphere, those in the two sterilizers, and the citrate bottles were kept in a storeroom with an average relative humidity of about 45 percent. Tap water was added at intervals to the sterilizer containing group 3 to maintain a semiconstant level.

Salinity determinations were made by an oil-bath conductivity bridge of the Woods Hole Oceanographic Institution, with a precision of $\pm 0.003°/_{\circ\circ}$. The day after filling all bottles the first glass citrate bottle was run to determine the salinity for $t=0$, which was $34.700°/_{\circ\circ}$. The time interval for examining the salinities and weight changes was scheduled for approximately 1, 2, 3, 4, 6, and 8 months after $t=0$.

Results and Discussion. The bottles in groups 1 and 2, after an apparent initial loss of salinity, showed an increase in salinity with time and an associated weight loss (fig. 37 and tables XI and XII). The one exception to this was the final bottle of group 2 (not plotted, but see table XI), which showed a relatively large increase of weight.

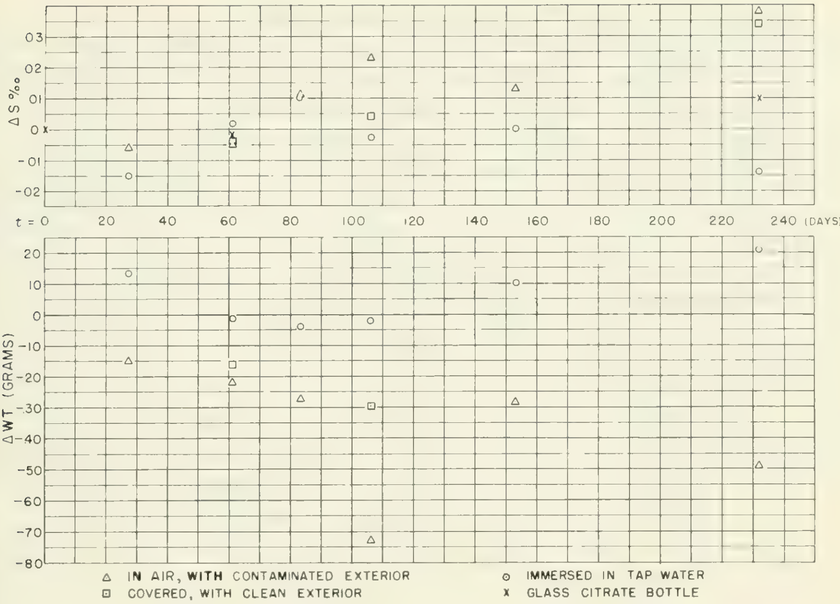

FIGURE 37.—Change of salinity and weight with time.

When analyzing the first and second bottles of group 2, they were weighed first, then washed. Just the converse was done for the final bottle; it was washed first, then weighed. It is believed that some of the weight gain was caused by its immersion in water (although toweled dry before weighing), but probably this was not enough to explain the entire increase. Those in group 3 oscillated between gains and losses in both weight and salinity, but they tended more toward a salinity decrease with a corresponding weight increase. It is of course recognized that polythylene bottles differ in construction and thus that each may vary from another to a certain extent in its permeability. When the salinities of the citrate bottles were measured, the second bottle's salinity was very close to the original value, whereas the third bottle's salinity was higher by 0.01‰.

The batch of Copenhagen water used to standardize the WHOI salinity bridge was changed between $t=61$ and $t=83$ days; therefore, because of this change there might have existed a small relative difference between the readings prior to and subsequent to this. This might explain the small difference between the last citrate reading and the first two. An equally plausible explanation of the salinity change in the citrate bottle could be evaporation occurring around the spring-operated lid.

For each sample the change of weight divided by the initial weight was plotted (fig. 38) against the change of salinity and then the groups were compared. Lines connecting the origin with the average of the

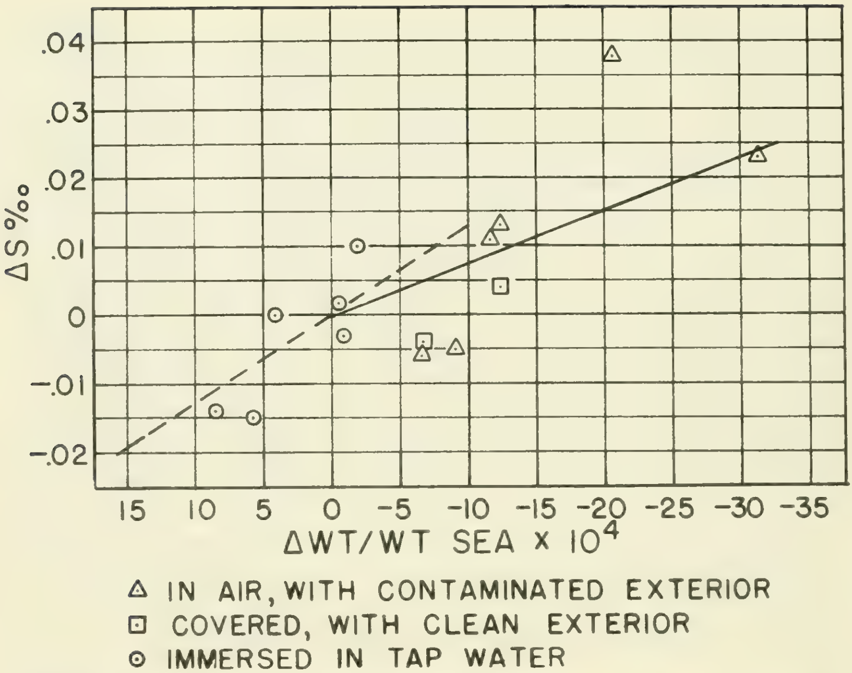

FIGURE 38.—Ratio of weight change to initial weight against salinity change.

points are shown for groups 1 and 3. No line is shown for those in group 2, since only two points are considered. It would be expected that the points in group 2 should fall near those in group 1, which is the case. The slope of these lines is approximately 1/100, which is construed to mean that the change of salinity is about two orders of magnitude less than the change in weight.

The initial test of the wash water by the flame photometer for sodium content on the exterior of the polyethylene bottles showed a blank contamination on the order of 0.05 to 0.10 part per million. On all the remaining tests there appeared to be no greater concentration than found in the blank. If the weight loss were a result of the salt solution rather than pure water passing through the walls of the bottle, the concentration of sodium, considering the volume of wash water, should have been about 4 to 6 parts per million.

The environmental conditions within the storeroom varied to some extent. The experiment began in the winter and ended in the summer. There was a general increase in relative humidity and temperature between $t=153$ days in early May and $t=232$ days in late July; this most probably varied the osmotic effect.

On the assumption that only pure water passes through the walls of the bottles, the resultant salinities based on the change of weight were computed and are shown in table XIII. The average difference between the calculated and the observed salinities for those samples

immersed in water was $-0.006°/_{oo}$, whereas in all cases for those samples out of water the observed increase of salinity was considerably less than calculated, averaging $0.038°/_{oo}$ less. Cox similarly computed the salinity that a sea water sample might have if it lost weight at the rate that his distilled water did and concluded that a sample of sea water at $35.000°/_{oo}$ could easily increase $0.100°/_{oo}$ in a month. To the contrary, we found an almost negligible change in salinity at the end of 1 month and a maximum increase of only $0.038°/_{oo}$ at the end of 8 months.

Summary and Conclusions. Six polyethylene bottles filled with sea water were stored under field conditions for periods up to 8 months. There was an overall increase of salinity after the first 2 months of storage. All bottles lost weight; the last two of these bottles, one at 6 months and one at 8 months, lost 1.23% and 2.07%, respectively, of their weights, in close agreement with the 1.5% weight loss at the end of 8 months found by Romanovsky.

Three more bottles were placed in a relatively airtight container; prior to each salinity determination the bottle exterior was washed and this wash water was analyzed to determine if salt solution or only water was passing through the polyethylene walls. A flame photometer showed that there was no appreciable change in salt content over the entire period, although the photometer may have been operating at its lower level of sensitivity. The third and final bottle exhibited an anomalous behavior by a large increase of weight with its salinity increase.

Six bottles with sea water inside were immersed in tap water inside a covered container. There was generally a gain of weight and a decrease of salinity, which indicates a transfer of water into the bottle. This also stresses the effect of humidity upon the bottle contents, as pointed out by Cox.

It is apparent from the foregoing that there is some change of salinity associated with a change of weight within a polyethylene bottle, but its magnitude is only about 1/100th that of the change in weight. This is much less a salinity change than was computed by Cox, but is more than the negligible change observed by Romanovsky.

It is concluded, therefore, that polyethylene bottles can be used to store samples of sea water for periods up to several months without an appreciable change in salinity. Furthermore, it is believed that the salinity uncertainty of the samples from the *Evergreen* postseason cruise stored for 2 months in late summer 1962 is less than the proposed uncertainty of $0.04°/_{oo}$ mentioned in Bulletin No. 48 of this series.

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Table XI

[wt. in grams]

Time (days)	Bottle	Wt. empty	Wt. filled	Wt. sea water	Wt. at time *t*	ΔW	ΔW/Wt. sea × 10^4
$t=27$	DD-50	36.089	272.640	236.551	272.490	−0.150	−6.341
	I-20	35.776	264.635	228.859	264.770	+.135	+5.899
$t=61$	DD-40	35.770	278.450	242.680	278.230	−.220	−9.065
	J-21	36.139	263.500	227.361	263.489	−.011	−.484
	Z-20	35.436	276.711	241.275	276.550	−.161	−6.673
$t=83$	BB-21	35.239	274.105	238.866	273.831	−.274	−11.471
	BB-31	35.180	267.304	232.124	267.261	−.043	−1.852
$t=106$	J-31	35.619	269.782	234.163	269.050	−.732	−31.260
	Z-30	35.141	273.390	238.249	273.369	−.021	−.881
	D-31	35.941	280.048	244.107	279.750	−.298	−12.208
$t=153$	Y-20	35.669	268.788	233.119	268.502	−.286	−12.268
	C-41	36.320	268.583	232.263	268.682	+.099	+4.262
$t=232$	D-41	35.891	273.056	237.165	272.565	−.491	−20.703
	I-10	35.679	270.992	235.313	271.200	+.208	+8.839
	Y 19	35.569	271.274	235.705	271.995	+.721	+30.589

Table XII. Initial Salinity 34.700‰

[Time in days]

Time	Bottle	S	ΔS
$t=27$	DD-50	34.694	−0.006
	I-20	34.685	−.015
$t=61$	DD-40	34.695	−.005
	J-21	34.702	+.002
	Z-20	34.696	−.004
	Citrate-68	34.698	−.002
$t=83$	BB-12	34.711	+.011
	BB-31	34.710	+.010
$t=106$	J-31	34.723	+.023
	Z-30	34.697	−.003
	D-31	34.704	+.004
$t=153$	Y-20	34.713	+.013
	C-41	34.700	.000
$t=232$	D-41	34.738	+.038
	I-10	34.686	−.014
	Y-19	34.734	+.034
	Citrate-78	34.710	+.010

Table XIII

Bottle	Wt sea-water at time t (grams)	Calculated S (‰)	Observed S (‰)	Diff S cal-obs (‰)
	In tap water			
I-20	228.994	34.680	34.685	−0.005
J-21	227.350	34.702	34.702	.000
BB-31	232.081	34.706	34.710	−.004
Z-30	238.228	34.703	34.697	+.006
C-41	232.362	34.685	34.700	−.015
I-20	235.521	34.669	34.686	−.017
	Out of water			
DD-50	236.401	34.722	34.694	+0.028
DD-40	242.460	34.731	34.695	+.036
Z-20	241.114	34.723	34.696	+.027
BB-21	238.592	34.740	34.711	+.029
J-31	233.431	34.809	34.723	+.086
D-31	243.809	34.742	34.704	+.038
Y-20	232.833	34.743	34.713	+.030
D-41	236.674	34.772	34.738	+.034

TABLE OF OCEANOGRAPHIC DATA

The data collected during the period covered by this report (March–July 1963) are tabulated on the following pages. Station headings are the standard format used by the National Oceanographic Data Center, except that the NODC Reference No. (31–171) has been omitted for stations 8387–8727, inclusive, as has been the wave and present weather information. Soundings are uncorrected and based on a sounding velocity of 4,800 feet per second.

A prefix T in the depth field indicates a depth determined by thermometric calculations. Suffix Q indicates a value marked doubtful by the originator and a suffix P denotes a value designated as potentially implausible by NODC. Sound velocity (m/sec) has been computed at standard depths by Wilson's formula.

The temperature-salinity term, $10^5\Delta_{s,t}$, of the anomaly of specific volume for values of sigma-t, used in the original computation of the specific volume anomaly and subsequently in the dynamic heights shown in the figures of the text, has been taken from table III of "The Oceans." The specific volume anomalies computed by the NODC computer from the lengthy basic equations have values slightly less than those computed by using the above table. Therefore, the machine computed $\Sigma\Delta D$ values are less than those in the figures by approximately 3 millimeters of dynamic height summed over 1,000 meters.

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	41585N	05057 W		150	10	03	30	100	1963		8387	3400	16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		36	F03		007			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0332	3312	2638	0016550	0000	14614
111		OBS	0000	0332	3312	2638			14614
		STD	0010	0332	3312	2638	0016553	0017	14616
		STD	0020	0331	3312	2638	0016555	0033	14617
111		OBS	0028	0331	3312	2638			14618
		STD	0030	0331	3314	2640	0016385	0050	14619
		STD	0050	0332	3337	2658	0014661	0081	14626
111		OBS	0054	0332	3342	2662			14627
		STD	0075	0685	3432	2693	0011493	0113	14788
111		OBS	0082	0756	3451	2697			14819
		STD	0100	0805	3467	2703	0010587	0141	14843
111		OBS	0108	0818	3473	2706			14850
		STD	0125	0800	3477	2711	0009819	0166	14847
		STD	0150	0774	3483	2720	0009046	0190	14842
111		OBS	0163	0760	3486	2724			14839
		STD	0200	0572	3468	2736	0007556	0232	14768
111		OBS	T0217	0512	3463	2739			14746
		STD	0250	0516	3474	2747	0006497	0267	14754
		STD	0300	0521	3486	2756	0005730	0297	14766
111		OBS	0324	0524	3490	2759			14772
		STD	0400	0487	3494	2766	0004846	0350	14770
111		OBS	0431	0474	3495	2769			14770
		STD	0500	0449	3495	2772	0004438	0397	14771
		STD	0600	0423	3495	2774	0004241	0440	14777
111		OBS	T0638	0417	3495	2775			14780
		STD	0700	0416	3496	2776	0004172	0482	14790
		STD	0800	0415	3498	2778	0004113	0523	14807
111		OBS	0850	0414	3499	2778			14815
		STD	0900	0409	3499	2779	0004090	0564	14821
		STD	1000	0401	3498	2779	0004125	0605	14834
111		OBS	T1059	0396	3498	2780			14842
		STD	1100	0393	3498	2780	0004141	0647	14848
		STD	1200	0385	3496	2781	0004133	0688	14861
		STD	1300	0379	3497	2781	0004219	0730	14875
		STD	1400	0373	3497	2781	0004229	0772	14889
		STD	1500	0367	3497	2782	0004236	0815	14904
111		OBS	T1595	0363	3497	2782			14918

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	4159 N	05158 W		150	11	03	30	163	1963		8388	3840	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		34	F02		019			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN M. X 10³	SOUND VELOCITY
		STD	0000	0486	3335	2641	0016300	0000	14682
173		OBS	0000	0486	3335	2641			14682
		STD	0010	0485	3335	2641	0016271	0016	14684
		STD	0020	0484	3336	2641	0016242	0033	14685
173		OBS	0025	0484	3336	2642			14686
		STD	0030	0381	3327	2645	0015880	0049	14642
173		OBS	0048	0183	3315	2653			14558
		STD	0050	0186	3317	2654	0015019	0080	14560
173		OBS	0072	0342	3343	2662			14635
		STD	0075	0411	3360	2668	0013721	0115	14667
173		OBS	0097	0788	3455	2696			14835
		STD	0100	0792	3459	2698	0010990	0146	14837
		STD	0125	0823	3484	2713	0009636	0172	14856
173		OBS	0144	0847	3490	2714			14869
		STD	0150	0802	3484	2717	0009373	0196	14853
173		OBS	T0193	0557	3457	2729			14759
		STD	0200	0552	3459	2731	0007985	0239	14759
		STD	0250	0518	3468	2742	0006972	0277	14754
173		OBS	0290	0488	3473	2750			14749
		STD	0300	0477	3473	2751	0006152	0309	14746
173		OBS	0385	0411	3477	2761			14734
		STD	0400	0417	3479	2762	0005166	0366	14739
		STD	0500	0443	3492	2770	0004592	0415	14768
173		OBS	T0577	0452	3498	2774			14785
		STD	0600	0449	3498	2774	0004322	0459	14788
		STD	0700	0435	3498	2775	0004261	0502	14799
173		OBS	0773	0426	3498	2776			14807
		STD	0800	0423	3498	2777	0004219	0545	14810
		STD	0900	0412	3498	2778	0004185	0587	14822
173		OBS	T0972	0405	3498	2779			14831
		STD	1000	0402	3498	2779	0004159	0628	14835
		STD	1100	0393	3498	2780	0004141	0670	14848
		STD	1200	0384	3497	2780	0004194	0712	14860
		STD	1300	0375	3497	2781	0004169	0753	14873
		STD	1400	0367	3496	2781	0004226	0795	14887
173		OBS	T1473	0362	3495	2781			14897

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4220 N	05130 W		150	21	03	30	206	1963		8389	2980	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
			F00		002			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0321	3342	2663	0014189	0000	14614
214		OBS	0000	0321	3342	2663			14614
		STD	0010	0319	3351	2670	0013498	0014	14616
		STD	0020	0306	3357	2676	0012939	0027	14613
214		OBS	0024	0298	3359	2678			14610
		STD	0030	0272	3361	2682	0012358	0040	14600
214		OBS	0049	0210	3364	2690			14576
		STD	0050	0206	3364	2690	0011626	0064	14575
214		OBS	0073	0176	3364	2692			14565
		STD	0075	0182	3367	2694	0011231	0092	14569
214		OBS	0098	0256	3399	2714			14609
		STD	0100	0264	3402	2716	0009232	0118	14614
		STD	0125	0349	3436	2735	0007446	0139	14659
214		OBS	0147	0409	3458	2746			14691
		STD	0150	0416	3460	2747	0006332	0156	14695
214		OBS	T0196	0491	3481	2756			14736
		STD	0200	0487	3481	2756	0005569	0186	14735
		STD	0250	0450	3483	2762	0005062	0212	14728
214		OBS	0295	0439	3485	2765			14731
		STD	0300	0443	3486	2765	0004828	0237	14734
214		OBS	0393	0484	3498	2770			14768
		STD	0400	0481	3498	2770	0004478	0283	14768
		STD	0500	0443	3497	2774	0004220	0327	14769
214		OBS	T0590	0417	3496	2776			14773
		STD	0600	0415	3496	2776	0004075	0368	14773
		STD	0700	0396	3495	2777	0004028	0409	14782
214		OBS	0783	0385	3494	2778			14791
		STD	0800	0384	3494	2778	0004057	0449	14793
		STD	0900	0380	3494	2778	0004100	0490	14808
214		OBS	T0973	0377	3494	2778			14819
		STD	1000	0376	3494	2778	0004141	0531	14823
		STD	1100	0372	3494	2779	0004180	0573	14838
		STD	1200	0367	3494	2779	0004205	0615	14853
		STD	1300	0363	3494	2780	0004240	0657	14868
		STD	1400	0359	3494	2780	0004272	0700	14883
214		OBS	T1480	0355	3494	2781			14895

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4241 N	05102 W		150	21	03	31	008	1963		8390	1850	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F03		001			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0047	3331	2679	0012700	0000	14448
020	OBS	0000	-0047	3331	2679			14448
	STD	0010	-0069	3332	2680	0012521	0013	14439
	STD	0020	-0086	3333	2682	0012364	0025	14433
020	OBS	0025	-0093	3334	2683			14431
	STD	0030	-0101	3336	2685	0012110	0037	14428
	STD	0050	-0111	3347	2694	0011224	0061	14428
020	OBS	0050	-0111	3347	2694			14428
	STD	0075	-0071	3363	2705	0010129	0087	14454
020	OBS	0075	-0071	3363	2705			14454
	STD	0100	0007	3386	2720	0008716	0111	14497
020	OBS	0100	0007	3386	2720			14497
	STD	0125	0112	3409	2733	0007578	0131	14552
020	OBS	0148	0179	3425	2741			14587
	STD	0150	0181	3426	2742	0006783	0149	14589
020	OBS	T0198	0224	3439	2749			14617
	STD	0200	0227	3440	2749	0006110	0181	14619
	STD	0250	0301	3460	2759	0005284	0210	14662
020	OBS	0296	0345	3473	2765			14690
	STD	0300	0346	3473	2765	0004758	0235	14692
020	OBS	0391	0365	3480	2768			14716
	STD	0400	0368	3481	2769	0004491	0281	14718
	STD	0500	0393	3488	2772	0004327	0325	14746
020	OBS	T0578	0400	3491	2774			14763
	STD	0600	0395	3491	2774	0004220	0368	14764
	STD	0700	0377	3491	2776	0004109	0410	14773
020	OBS	0765	0370	3491	2777			14781
	STD	0800	0369	3491	2777	0004107	0451	14787
	STD	0900	0367	3491	2777	0004171	0492	14802
020	OBS	T0949	0366	3491	2777			14810
	STD	1000	0365	3491	2777	0004233	0534	14818
	STD	1100	0363	3491	2777	0004293	0577	14834
	STD	1200	0360	3491	2778	0004340	0620	14850
	STD	1300	0358	3491	2778	0004398	0664	14865
	STD	1400	0355	3491	2778	0004442	0708	14881
020	OBS	T1441	0354	3491	2778			14887

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4253 N	05051 W		150	20	03	31	048	1963		8391	1180	09

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		002			

MESSENGER TIME HR 1/10	or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0090	3314	2658	0014654	0000	14508
053		OBS	0000	0090	3314	2658			14508
		STD	0010	0037	3330	2674	0013150	0014	14488
		STD	0020	-0001	3341	2685	0012125	0027	14474
053		OBS	0023	-0010	3344	2687			14470
		STD	0030	-0019	3346	2689	0011659	0038	14468
053		OBS	0047	-0031	3352	2695			14466
		STD	0050	-0029	3353	2696	0011075	0061	14467
053		OBS	0070	-0021	3360	2701			14475
		STD	0075	-0020	3361	2702	0010497	0088	14477
053		OBS	0093	-0017	3366	2705			14482
		STD	0100	-0010	3368	2707	0010004	0114	14487
		STD	0125	0017	3376	2712	0009525	0138	14504
053		OBS	0139	0033	3381	2715			14514
		STD	0150	0046	3385	2718	0008997	0161	14523
053		OBS	T0186	0088	3398	2726			14549
		STD	0200	0110	3404	2729	0007955	0204	14562
		STD	0250	0174	3422	2739	0007067	0241	14602
053		OBS	0279	0203	3430	2743			14620
		STD	0300	0215	3434	2745	0006511	0275	14630
053		OBS	0371	0251	3445	2751			14659
		STD	0400	0262	3449	2753	0005847	0337	14669
		STD	0500	0299	3461	2760	0005363	0393	14703
053		OBS	T0554	0318	3467	2763			14721
		STD	0600	0339	3473	2765	0004950	0445	14738
		STD	0700	0372	3484	2771	0004573	0492	14770
053		OBS	0743	0380	3487	2773			14781
		STD	0800	0379	3488	2773	0004449	0537	14790
		STD	0900	0377	3490	2775	0004395	0582	14806
053		OBS	T0934	0376	3490	2775			14812

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	42585N	05041 W		150	20	03	31	080	1963		8392	0605	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		21	F03		004			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0060	3317	2662	0014261	0000	14495
084		OBS	0000	0060	3317	2662			14495
		STD	0010	0056	3318	2663	0014198	0014	14495
		STD	0020	0051	3318	2663	0014142	0028	14494
084		OBS	0022	0050	3318	2663			14494
		STD	0030	-0004	3326	2673	0013254	0042	14472
084		OBS	0045	-0063	3340	2686			14449
		STD	0050	-0062	3344	2690	0011627	0067	14451
084		OBS	0067	-0051	3355	2698			14460
		STD	0075	-0042	3359	2701	0010553	0095	14466
084		OBS	0089	-0025	3365	2705			14477
		STD	0100	-0012	3369	2708	0009918	0120	14486
		STD	0125	0018	3377	2713	0009454	0145	14505
084		OBS	0135	0030	3380	2714			14512
		STD	0150	0052	3384	2716	0009107	0168	14525
084		OBS	T0179	0086	3392	2721			14547
		STD	0200	0092	3395	2723	0008519	0212	14553
		STD	0250	0117	3404	2728	0008011	0253	14574
084		OBS	0272	0133	3409	2731			14585
		STD	0300	0168	3420	2738	0007188	0291	14607
084		OBS	0367	0237	3442	2750			14651
		STD	0400	0263	3450	2754	0005781	0356	14669
		STD	0500	0311	3465	2762	0005184	0411	14709
084		OBS	T0563	0316	3467	2763			14721

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4302 N	05038 W		150	30	03	31	093	1963		8393	0175	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		21	F03		007			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0108	3313	2656	0014835	0000	14516
096		OBS	0000	0108	3313	2656			14516
		STD	0010	0096	3316	2659	0014536	0015	14513
		STD	0020	0074	3320	2664	0014106	0029	14505
096		OBS	0025	0060	3323	2667			14500
		STD	0030	0030	3328	2673	0013263	0043	14488
		STD	0050	-0048	3343	2688	0011759	0068	14457
096		OBS	0050	-0048	3343	2688			14457
096		OBS	0074	-0054	3354	2697			14460
		STD	0075	-0054	3354	2698	0010871	0096	14460
096		OBS	0099	-0047	3358	2700			14468
		STD	0100	-0046	3358	2701	0010581	0123	14469
		STD	0125	-0028	3365	2705	0010172	0149	14482
		STD	0150	0002	3371	2709	0009824	0174	14501
096		OBS	T0150	0002	3371	2709			14501

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4306 N	05030 W		150	30	03	31	105	1963		8394	0090	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		20	F04		019			

MESSENGER or CAST TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0199	3263	2610	0019219	0000	14550
108		OBS	0000	0199	3263	2610			14550
		STD	0010	0142	3270	2619	0018312	0019	14527
		STD	0020	0101	3280	2630	0017305	0037	14512
108		OBS	0026	0084	3287	2637			14506
		STD	0030	0083	3294	2642	0016133	0053	14507
		STD	0050	0075	3328	2670	0013504	0083	14512
108		OBS	0051	0075	3330	2672			14512
		STD	0075	0141	3367	2697	0010947	0113	14551
108		OBS	T0077	0150	3370	2699			14555

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4321 N	05018 W		150	30	03	31	127	1963		8395	0075	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		20	F05		029			

MESSENGER or CAST TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0223	3258	2604	0019768	0000	14560
131		OBS	0000	0223	3258	2604			14560
		STD	0010	0208	3259	2606	0019587	0020	14555
		STD	0020	0194	3259	2607	0019491	0039	14550
131		OBS	0026	0186	3260	2608			14548
		STD	0030	0181	3261	2609	0019282	0059	14546
		STD	0050	0155	3264	2614	0018876	0097	14539
131		OBS	T0052	0152	3264	2614			14538

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	43005N	05015 W		150	30	03	31	152	1963		8396	0091	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		18	F05		031			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0089	3310	2655	0014953	0000	14507
155	OBS	0000	0089	3310	2655			14507
	STD	0010	0057	3318	2663	0014168	0015	14495
	STD	0020	0026	3325	2670	0013474	0028	14484
155	OBS	0025	0012	3328	2673			14479
	STD	0030	-0006	3331	2677	0012863	0042	14472
	STD	0050	-0051	3340	2686	0011976	0066	14455
155	OBS	0050	-0051	3340	2686			14455
	STD	0075	-0048	3349	2693	0011291	0095	14462
155	OBS	T0075	-0048	3349	2693			14462

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4250 N	05015 W		150	20	03	31	165	1963		8397	0358	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F05		038			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0081	3325	2675	0013035	0000	14431
170	OBS	0000	-0081	3325	2675			14431
	STD	0010	-0077	3327	2676	0012922	0013	14435
	STD	0020	-0072	3328	2677	0012811	0026	14439
170	OBS	0025	-0070	3329	2678			14441
	STD	0030	-0040	3343	2688	0011799	0038	14458
170	OBS	0049	0045	3379	2713			14505
	STD	0050	0047	3380	2713	0009388	0059	14506
170	OBS	0074	0083	3389	2719			14527
	STD	0075	0084	3389	2719	0008900	0082	14528
170	OBS	0098	0096	3393	2721			14538
	STD	0100	0097	3393	2721	0008678	0104	14539
	STD	0125	0107	3396	2722	0008554	0126	14548
170	OBS	0148	0114	3398	2724			14555
	STD	0150	0114	3398	2724	0008430	0147	14555
170	OBS	T0197	0120	3399	2724			14566
	STD	0200	0120	3399	2724	0008395	0189	14566
	STD	0250	0122	3401	2725	0008310	0231	14576
	STD	0300	0124	3402	2726	0008234	0272	14585
170	OBS	T0306	0124	3402	2726			14586

731-298 O—64——7

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	42395N	05016 W		150	20	03	31	187	1963		8398	1443	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		18	F05		051			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M X 10^3	SOUND VELOCITY
	STD	0000	-0041	3328	2676	0012953	0000	14450
192	OBS	0000	-0041	3328	2676			14450
	STD	0010	-0046	3332	2679	0012623	0013	14450
	STD	0020	-0048	3337	2683	0012229	0025	14451
192	OBS	0025	-0049	3341	2687			14452
	STD	0030	-0048	3348	2692	0011383	0037	14455
	STD	0050	-0045	3368	2708	0009860	0058	14462
192	OBS	0051	-0045	3369	2709			14462
	STD	0075	-0026	3378	2716	0009173	0082	14476
192	OBS	0076	-0024	3379	2716			14478
	STD	0100	0061	3400	2729	0007944	0103	14523
192	OBS	0101	0064	3401	2729			14525
	STD	0125	0127	3415	2737	0007231	0122	14559
	STD	0150	0178	3429	2745	0006504	0140	14588
192	OBS	0151	0180	3430	2745			14589
	STD	0200	0236	3443	2751	0005959	0171	14624
192	OBS	T0202	0238	3444	2751			14625
	STD	0250	0278	3457	2758	0005299	0199	14652
	STD	0300	0312	3467	2763	0004898	0224	14676
192	OBS	0305	0315	3468	2764			14678
	STD	0400	0354	3479	2769	0004495	0271	14712
192	OBS	0408	0357	3480	2769			14715
	STD	0500	0370	3484	2771	0004414	0316	14736
	STD	0600	0379	3487	2773	0004325	0360	14757
192	OBS	T0620	0380	3488	2773			14761
	STD	0700	0380	3488	2774	0004341	0403	14774
	STD	0800	0381	3489	2774	0004399	0447	14791
192	OBS	0822	0381	3489	2774			14795
	STD	0900	0380	3489	2774	0004468	0491	14807
	STD	1000	0378	3489	2774	0004538	0536	14824
192	OBS	T1020	0378	3489	2774			14827
	STD	1100	0376	3489	2775	0004568	0582	14839
	STD	1200	0373	3490	2776	0004580	0627	14855
	STD	1300	0368	3490	2776	0004574	0673	14870
	STD	1400	0363	3491	2777	0004557	0719	14884
192	OBS	T1443	0361	3491	2778			14891

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4224 N	05015 W		150	20	03	31	217	1963		8399		14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		18	F05		069			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0478	3351	2654	0015014	0000	14681
223		OBS	0000	0478	3351	2654			14681
		STD	0010	0508	3362	2660	0014488	0015	14697
		STD	0020	0538	3374	2665	0013969	0029	14712
223		OBS	0021	0541	3375	2666			14714
		STD	0030	0446	3369	2672	0013358	0043	14675
223		OBS	0042	0364	3365	2677			14642
		STD	0050	0358	3367	2679	0012670	0069	14641
223		OBS	0063	0347	3370	2683			14639
		STD	0075	0410	3398	2699	0010855	0098	14671
223		OBS	0084	0444	3415	2709			14689
		STD	0100	0447	3434	2723	0008556	0122	14696
		STD	0125	0452	3456	2740	0006984	0142	14705
223		OBS	0126	0452	3457	2741			14705
		STD	0150	0473	3468	2747	0006343	0158	14719
223		OBS	T0168	0483	3474	2751			14727
		STD	0200	0475	3479	2756	0005607	0188	14730
		STD	0250	0463	3487	2763	0004957	0215	14734
223		OBS	0253	0462	3487	2764			14734
		STD	0300	0461	3492	2768	0004580	0239	14742
223		OBS	0338	0460	3495	2770			14749
		STD	0400	0439	3495	2773	0004218	0283	14750
		STD	0500	0410	3495	2776	0003994	0324	14755
223		OBS	T0509	0408	3495	2776			14755
		STD	0600	0389	3494	2777	0003930	0363	14762
223		OBS	0687	0375	3493	2778			14771
		STD	0700	0374	3493	2778	0003935	0403	14772
		STD	0800	0366	3492	2778	0003969	0442	14785
223		OBS	T0869	0361	3492	2778			14795
		STD	0900	0360	3492	2778	0004020	0482	14800
		STD	1000	0359	3492	2779	0004084	0523	14816
		STD	1100	0357	3492	2779	0004145	0564	14832
		STD	1200	0355	3492	2779	0004205	0605	14847
		STD	1300	0353	3492	2779	0004264	0648	14864
223		OBS	T1359	0352	3492	2779			14873

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4200 N	05016 W		150	20	04	01	015	1963		8400		15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS
		32	F03		036			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0510	3351	2651	0015355	0000	14694
023		OBS	0000	0510	3351	2651			14694
		STD	0010	0485	3351	2654	0015067	0015	14686
		STD	0020	0471	3352	2656	0014899	0030	14682
023		OBS	0024	0468	3352	2656			14681
		STD	0030	0472	3356	2659	0014604	0045	14684
023		OBS	0048	0487	3371	2669			14695
		STD	0050	0489	3373	2671	0013511	0073	14697
023		OBS	0072	0516	3398	2687			14715
		STD	0075	0557	3410	2692	0011549	0104	14734
023		OBS	0095	0756	3470	2712			14824
		STD	0100	0752	3474	2716	0009319	0130	14824
		STD	0125	0734	3485	2727	0008285	0152	14822
023		OBS	0142	0721	3487	2731			14820
		STD	0150	0669	3482	2734	0007675	0172	14801
023		OBS	T0190	0477	3466	2745			14727
		STD	0200	0481	3469	2747	0006413	0208	14731
		STD	0250	0496	3481	2755	0005745	0238	14747
023		OBS	0289	0503	3489	2761			14757
		STD	0300	0503	3490	2761	0005209	0265	14759
023		OBS	0389	0498	3499	2769			14773
		STD	0400	0491	3499	2770	0004521	0314	14772
		STD	0500	0441	3496	2773	0004272	0358	14768
023		OBS	T0597	0407	3494	2775			14769
		STD	0600	0407	3494	2775	0004133	0400	14770
		STD	0700	0395	3494	2777	0004091	0441	14781
023		OBS	0794	0387	3494	2777			14794
		STD	0800	0387	3494	2777	0004091	0482	14795
		STD	0900	0381	3495	2778	0004075	0523	14809
023		OBS	T0990	0377	3495	2779			14822
		STD	1000	0377	3495	2779	0004079	0564	14824
		STD	1100	0372	3495	2780	0004107	0605	14838
		STD	1200	0367	3495	2780	0004131	0646	14853
		STD	1300	0363	3495	2781	0004166	0687	14868
		STD	1400	0359	3495	2781	0004199	0729	14883
		STD	1500	0355	3495	2781	0004229	0771	14898
023		OBS	T1501	0355	3495	2781			14898

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4130 N	05014 W		150	10	04	01	067	1963		8401		16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		32	F06		023			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0307	3312	2640	0016336	0000	14604
073		OBS	0000	0307	3312	2640			14604
		STD	0010	0306	3312	2641	0016302	0016	14605
		STD	0020	0305	3313	2641	0016267	0033	14606
073		OBS	0026	0304	3313	2641			14607
		STD	0030	0307	3319	2645	0015862	0049	14609
		STD	0050	0323	3346	2666	0013923	0078	14623
073		OBS	0052	0325	3349	2668			14625
		STD	0075	0982	3487	2690	0011773	0111	14908
073		OBS	0078	1021	3495	2690			14924
		STD	0100	0936	3478	2691	0011754	0140	14894
073		OBS	0103	0931	3477	2691			14892
		STD	0125	1037	3507	2696	0011317	0169	14939
		STD	0150	1087	3526	2702	0010833	0197	14963
073		OBS	0156	1088	3528	2703			14965
		STD	0200	0943	3509	2714	0009784	0248	14917
073		OBS	T0207	0920	3506	2715			14909
		STD	0250	0758	3490	2728	0008469	0294	14853
		STD	0300	0618	3479	2738	0007454	0333	14805
073		OBS	0310	0597	3478	2740			14798
		STD	0400	0510	3484	2756	0005864	0400	14778
073		OBS	0415	0500	3485	2758			14776
		STD	0500	0493	3492	2764	0005182	0455	14789
		STD	0600	0482	3498	2770	0004719	0505	14801
073		OBS	T0622	0479	3499	2771			14804
		STD	0700	0464	3499	2773	0004507	0551	14811
		STD	0800	0446	3500	2776	0004357	0595	14820
073		OBS	0828	0441	3500	2776			14823
		STD	0900	0430	3500	2777	0004279	0638	14830
		STD	1000	0416	3499	2778	0004242	0681	14841
073		OBS	T1033	0412	3499	2779			14844
		STD	1100	0404	3499	2780	0004204	0723	14852
		STD	1200	0393	3498	2780	0004232	0765	14864
		STD	1300	0384	3498	2781	0004209	0808	14877
		STD	1400	0376	3498	2782	0004194	0850	14891
		STD	1500	0370	3497	2781	0004275	0892	14905
073		OBS	T1571	0367	3497	2782			14916

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4100 N	05015 W		150	10	04	01	104	1963		8402		16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		34	F06		025			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1392	3582	2685	0012044	0000	15049
112		OBS	0000	1392	3582	2685			15049
		STD	0010	1405	3582	2683	0012334	0012	15055
		STD	0020	1414	3582	2681	0012546	0025	15060
112		OBS	0026	1418	3582	2680			15062
		STD	0030	1418	3582	2680	0012657	0037	15063
		STD	0050	1418	3582	2680	0012715	0063	15066
112		OBS	0051	1418	3582	2680			15066
		STD	0075	1419	3582	2680	0012807	0095	15070
112		OBS	0077	1419	3582	2680			15071
		STD	0100	1419	3582	2680	0012883	0127	15074
112		OBS	0102	1419	3582	2680			15075
		STD	0125	1411	3581	2681	0012855	0159	15076
		STD	0150	1402	3580	2682	0012810	0191	15077
112		OBS	0155	1400	3580	2682			15077
		STD	0200	1264	3550	2687	0012435	0254	15036
112		OBS	T0206	1249	3547	2688			15031
		STD	0250	1190	3545	2698	0011536	0314	15018
		STD	0300	1103	3539	2709	0010516	0369	14995
112		OBS	0309	1085	3538	2712			14990
		STD	0400	0858	3515	2732	0008394	0464	14919
112		OBS	0413	0830	3512	2734			14910
		STD	0500	0684	3506	2751	0006645	0539	14867
		STD	0600	0557	3501	2764	0005440	0599	14832
112		OBS	T0620	0537	3500	2765			14827
		STD	0700	0490	3499	2770	0004894	0651	14821
		STD	0800	0444	3497	2773	0004577	0698	14819
112		OBS	0832	0432	3496	2774			14819
		STD	0900	0417	3496	2776	0004416	0743	14824
		STD	1000	0399	3495	2777	0004329	0787	14833
112		OBS	T1047	0392	3495	2778			14838
		STD	1100	0391	3495	2778	0004326	0830	14846
		STD	1200	0388	3495	2778	0004369	0874	14862
		STD	1300	0385	3496	2779	0004409	0918	14877
		STD	1400	0383	3496	2779	0004448	0962	14893
		STD	1500	0380	3496	2780	0004485	1007	14909
112		OBS	T1576	0378	3496	2780			14921

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4200 N	04928 W		149	29	04	01	221	1963		8403		16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		34	F05		-014			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0351	3334	2654	0015057	0000	14625
230		OBS	0000	0351	3334	2654			14625
		STD	0010	0356	3334	2653	0015112	0015	14629
		STD	0020	0362	3334	2653	0015168	0030	14633
230		OBS	0026	0365	3334	2652			14636
		STD	0030	0343	3336	2656	0014854	0045	14627
		STD	0050	0288	3348	2671	0013483	0074	14608
230		OBS	0053	0287	3351	2673			14609
		STD	0075	0355	3376	2687	0011979	0105	14645
230		OBS	0079	0366	3381	2690			14651
		STD	0100	0419	3407	2705	0010292	0133	14680
230		OBS	0105	0427	3412	2708			14685
		STD	0125	0425	3429	2722	0008726	0157	14690
		STD	0150	0420	3444	2734	0007573	0177	14694
230		OBS	0157	0418	3448	2738			14695
		STD	0200	0398	3459	2748	0006268	0212	14695
230		OBS	T0209	0397	3461	2750			14696
		STD	0250	0436	3474	2756	0005596	0242	14721
		STD	0300	0465	3486	2763	0005075	0268	14743
248		OBS	T0317	0470	3489	2764			14748
		STD	0400	0452	3493	2770	0004514	0316	14755
248		OBS	0419	0449	3494	2771			14757
		STD	0500	0447	3496	2773	0004306	0360	14770
		STD	0600	0444	3499	2776	0004163	0403	14786
248		OBS	0623	0443	3500	2776			14789
		STD	0700	0430	3500	2777	0004083	0444	14797
		STD	0800	0416	3499	2778	0004047	0485	14807
248		OBS	0831	0412	3499	2779			14811
		STD	0900	0405	3499	2779	0004027	0525	14819
		STD	1000	0396	3499	2780	0004012	0565	14832
248		OBS	T1040	0394	3499	2781			14838
		STD	1100		3499				
		STD	1200		3499				
		STD	1300		3499				
		STD	1400		3498				
		STD	1500		3498				
248		OBS	1565		3498				

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4130 N	04900 W		149	19	04	02	053	1963		8404		16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		34	F04		013			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	1231	3541	2687	0011944	0000	14991
061	OBS	0000	1231	3541	2687			14991
	STD	0010	1231	3541	2686	0011978	0012	14992
	STD	0020	1232	3541	2686	0012009	0024	14994
061	OBS	0027	1232	3541	2686			14995
	STD	0030	1232	3541	2686	0012043	0036	14996
	STD	0050	1233	3541	2686	0012111	0060	14999
061	OBS	0054	1233	3541	2686			15000
	STD	0075	1233	3541	2686	0012178	0090	15003
061	OBS	0081	1233	3541	2686			15004
	STD	0100	1234	3541	2686	0012263	0121	15008
061	OBS	0108	1235	3541	2686			15010
	STD	0125	1237	3542	2686	0012333	0152	15013
	STD	0150	1239	3543	2686	0012368	0183	15018
061	OBS	0162	1240	3543	2686			15020
	STD	0200	1233	3550	2693	0011846	0243	15025
061	OBS	T0216	1217	3551	2697			15022
	STD	0250	1116	3539	2707	0010628	0299	14991
	STD	0300	0969	3522	2720	0009462	0350	14945
061	OBS	0321	0908	3516	2725			14925
	STD	0400	0669	3496	2745	0007021	0432	14844
061	OBS	0422	0619	3492	2749			14827
	STD	0500	0554	3494	2758	0005820	0496	14814
	STD	0600	0491	3496	2767	0005007	0550	14805
061	OBS	T0619	0482	3496	2769			14804
	STD	0700	0462	3497	2771	0004675	0599	14810
	STD	0800	0439	3498	2775	0004435	0644	14817
061	OBS	0827	0433	3498	2776			14819
	STD	0900	0417	3497	2777	0004320	0688	14824
	STD	1000	0398	3496	2777	0004295	0731	14833
061	OBS	T1036	0392	3495	2778			14836
	STD	1100	0388	3495	2778	0004310	0774	14845
	STD	1200	0382	3495	2778	0004338	0817	14859
	STD	1300	0376	3495	2779	0004355	0861	14873
	STD	1400	0370	3494	2779	0004378	0905	14888
	STD	1500	0364	3494	2780	0004398	0948	14902
061	OBS	T1624	0356	3494	2781			14919

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4100 N	04830 W		149	18	04	02	105	1963		8405		16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		29	F05		055			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1243	3545	2687	0011873	0000	14995
111		OBS	0000	1243	3545	2687			14995
		STD	0010	1245	3545	2687	0011966	0012	14997
		STD	0020	1248	3544	2686	0012071	0024	15000
111		OBS	0027	1249	3544	2685			15001
		STD	0030	1250	3544	2685	0012142	0036	15002
		STD	0050	1253	3545	2685	0012206	0060	15007
111		OBS	0054	1254	3545	2685			15008
		STD	0075	1254	3545	2685	0012279	0091	15011
111		OBS	0082	1254	3545	2685			15012
		STD	0100	1256	3546	2685	0012332	0122	15016
111		OBS	0109	1257	3546	2685			15018
		STD	0125	1260	3547	2685	0012408	0153	15022
		STD	0150	1263	3548	2685	0012466	0184	15027
111		OBS	0162	1264	3548	2685			15029
		STD	0200	1261	3552	2689	0012228	0246	15035
111		OBS	T0217	1260	3554	2691			15038
		STD	0250	1161	3543	2702	0011148	0304	15008
		STD	0300	1010	3526	2716	0009854	0356	14960
111		OBS	0321	0947	3519	2721			14940
		STD	0400	0696	3489	2736	0007913	0445	14853
111		OBS	0421	0646	3484	2739			14836
		STD	0500	0592	3491	2752	0006474	0517	14829
		STD	0600	0530	3501	2767	0005108	0575	14821
111		OBS	T0613	0523	3502	2769			14821
		STD	0700	0470	3499	2772	0004603	0624	14813
		STD	0800	0427	3496	2775	0004430	0669	14811
111		OBS	0824	0419	3495	2775			14812
		STD	0900	0412	3495	2776	0004407	0713	14822
		STD	1000	0404	3495	2776	0004405	0757	14835
111		OBS	T1038	0401	3495	2777			14840
		STD	1100	0396	3495	2777	0004399	0801	14848
		STD	1200	0388	3495	2778	0004391	0845	14862
		STD	1300	0381	3495	2779	0004391	0889	14876
		STD	1400	0374	3495	2779	0004389	0933	14889
		STD	1500	0368	3495	2780	0004396	0977	14904
111		OBS	T1560	0364	3495	2780			14912

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4137 N	04717 W		149	17	04	02	182	1963		8406		16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		22	F05		076			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0529	3367	2661	0014363	0000	14704
195		OBS	0000	0529	3367	2661			14704
		STD	0010	0526	3367	2661	0014341	0014	14705
		STD	0020	0524	3367	2662	0014330	0029	14706
195		OBS	0025	0523	3367	2662			14706
		STD	0030	0522	3367	2662	0014323	0043	14707
		STD	0050	0520	3367	2662	0014318	0072	14709
195		OBS	0050	0520	3367	2662			14709
		STD	0075	0586	3397	2678	0012864	0106	14744
195		OBS	0075	0586	3397	2678			14744
		STD	0100	0675	3426	2689	0011847	0137	14787
195		OBS	0100	0675	3426	2689			14787
		STD	0125	0599	3443	2713	0009652	0163	14763
195		OBS	0149	0554	3456	2728			14751
		STD	0150	0554	3456	2729	0008147	0186	14751
195		OBS	T0199	0548	3471	2741			14759
		STD	0200	0547	3471	2741	0007026	0224	14759
		STD	0250	0513	3475	2748	0006394	0257	14753
		STD	0300	0479	3479	2755	0005776	0288	14748
195		OBS	0302	0478	3479	2756			14748
		STD	0400	0528	3498	2765	0005041	0342	14787
195		OBS	0407	0529	3499	2765			14789
		STD	0500	0479	3498	2770	0004591	0390	14784
		STD	0600	0437	3496	2774	0004307	0434	14783
195		OBS	T0624	0429	3496	2774			14783
		STD	0700	0411	3495	2776	0004179	0477	14788
		STD	0800	0391	3494	2777	0004116	0518	14796
195		OBS	0828	0386	3494	2777			14799
		STD	0900	0375	3493	2778	0004093	0559	14806
		STD	1000	0362	3492	2779	0004101	0600	14817
195		OBS	T1031	0359	3492	2779			14821
		STD	1100	0359	3493	2779	0004130	0641	14832
		STD	1200	0358	3493	2780	0004147	0683	14849
		STD	1300	0358	3494	2780	0004171	0724	14866
		STD	1400	0357	3495	2781	0004187	0766	14882
		STD	1500	0356	3496	2782	0004202	0808	14899
195		OBS	T1556	0356	3496	2782			14908

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	41595N	04754 W		149	17	04	02	237	1963		8407		15

WATER COLOR CODE	TRANS (m)	WIND DIR	SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	WET BULB	VIS CODE	ADD'L OBS
		25	F04		084			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M X 10³	SOUND VELOCITY
		STD	0000	0561	3374	2663	0014200	0000	14718
248		OBS	0000	0561	3374	2663			14718
		STD	0010	0561	3374	2663	0014212	0014	14720
		STD	0020	0561	3374	2663	0014223	0028	14722
248		OBS	0025	0561	3374	2663			14722
		STD	0030	0561	3374	2663	0014218	0043	14723
		STD	0050	0560	3375	2664	0014173	0071	14726
248		OBS	0050	0560	3375	2664			14726
		STD	0075	0697	3420	2681	0012545	0104	14791
248		OBS	0075	0697	3420	2681			14791
		STD	0100	0705	3441	2697	0011122	0134	14801
248		OBS	0101	0705	3442	2698			14801
		STD	0125	0680	3465	2719	0009047	0159	14799
		STD	0150	0664	3482	2735	0007609	0180	14799
248		OBS	0150	0664	3482	2735			14799
		STD	0200	0665	3496	2745	0006681	0216	14809
248		OBS	T0201	0665	3496	2746			14809
		STD	0250	0604	3497	2754	0005902	0247	14793
		STD	0300	0557	3497	2760	0005344	0275	14782
248		OBS	0301	0556	3497	2761			14782
		STD	0400	0509	3500	2769	0004662	0325	14780
248		OBS	0400	0509	3500	2769			14780
		STD	0500	0459	3498	2773	0004332	0370	14775
248		OBS	T0598	0426	3497	2776			14778
		STD	0600	0426	3497	2776	0004127	0413	14778
		STD	0700	0414	3497	2777	0004088	0454	14790
248		OBS	0793	0404	3497	2778			14801
		STD	0800	0403	3497	2778	0004056	0494	14802
		STD	0900	0394	3497	2779	0004080	0535	14814
248		OBS	T0988	0387	3496	2779			14826
		STD	1000	0386	3496	2779	0004113	0576	14828
		STD	1100	0378	3496	2780	0004105	0617	14841
		STD	1200	0371	3495	2780	0004180	0659	14855
		STD	1300	0365	3495	2780	0004191	0700	14869
		STD	1400	0359	3495	2781	0004199	0742	14883
248		OBS	T1481	0355	3495	2781			14895

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4219 N	04832 W		149	28	04	03	055	1963		8408		15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		32	F05		032			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0571	3377	2664	0014090	0000	14723
066		OBS	0000	0571	3377	2664			14723
		STD	0010	0570	3377	2664	0014093	0014	14724
		STD	0020	0569	3377	2664	0014095	0028	14725
066		OBS	0024	0569	3377	2664			14726
		STD	0030	0569	3377	2664	0014103	0042	14727
066		OBS	0049	0568	3377	2664			14730
		STD	0050	0568	3377	2664	0014116	0071	14730
066		OBS	0073	0567	3378	2665			14733
		STD	0075	0591	3384	2667	0013895	0106	14744
066		OBS	0099	0756	3434	2684			14820
		STD	0100	0744	3434	2686	0012176	0138	14815
		STD	0125	0506	3435	2717	0009190	0165	14724
066		OBS	0147	0395	3435	2730			14682
		STD	0150	0402	3438	2731	0007838	0186	14686
066		OBS	T0196	0477	3470	2749			14729
		STD	0200	0477	3471	2749	0006214	0221	14730
		STD	0250	0471	3481	2758	0005465	0250	14737
066		OBS	0293	0467	3488	2764			14743
		STD	0300	0470	3489	2764	0004908	0276	14746
066		OBS	0388	0495	3499	2769			14772
		STD	0400	0490	3499	2770	0004517	0323	14772
		STD	0500	0458	3498	2773	0004290	0368	14775
066		OBS	T0575	0440	3498	2775			14780
		STD	0600	0439	3498	2775	0004197	0410	14784
		STD	0700	0431	3499	2776	0004169	0452	14797
075		OBS	0773	0423	3499	2778			14806
		STD	0800	0418	3499	2778	0004086	0493	14808
		STD	0900	0402	3498	2779	0004065	0534	14818
075		OBS	T0973	0391	3497	2779			14825
		STD	1000	0387	3497	2780	0004051	0574	14828
		STD	1100	0376	3496	2780	0004081	0615	14840
		STD	1200	0366	3495	2780	0004119	0656	14853
		STD	1300	0359	3495	2781	0004116	0697	14866
		STD	1400	0355	3494	2781	0004222	0739	14881
075		OBS	T1492	0353	3494	2781			14896

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4240 N	04912 W		149	29	04	03	118	1963		8409		16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		32	F07		009			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10[7]	Σ ΔD DYN. M. X 10[3]	SOUND VELOCITY
		STD	0000	0684	3407	2673	0013231	0000	14772
125		OBS	0000	0684	3407	2673			14772
		STD	0010	0684	3407	2673	0013281	0013	14774
		STD	0020	0685	3406	2672	0013331	0027	14775
125		OBS	0026	0685	3406	2672			14777
		STD	0030	0685	3406	2672	0013346	0040	14777
		STD	0050	0688	3408	2673	0013294	0067	14782
125		OBS	0053	0688	3408	2673			14782
		STD	0075	0842	3456	2689	0011898	0098	14852
125		OBS	0079	0853	3460	2690			14857
		STD	0100	0808	3454	2692	0011632	0127	14843
125		OBS	0105	0802	3452	2691			14841
		STD	0125	0824	3474	2705	0010389	0155	14855
		STD	0150	0851	3489	2713	0009733	0180	14872
125		OBS	0157	0859	3491	2713			14876
		STD	0200	0669	3474	2728	0008347	0225	14808
125		OBS	T0210	0637	3472	2730			14796
		STD	0250	0626	3483	2741	0007189	0264	14800
		STD	0300	0598	3492	2751	0006231	0298	14798
125		OBS	0314	0588	3494	2754			14797
		STD	0400	0489	3493	2766	0004929	0354	14771
125		OBS	0416	0475	3493	2767			14767
		STD	0500	0442	3493	2771	0004477	0401	14768
		STD	0600	0412	3494	2775	0004197	0444	14772
125		OBS	T0619	0407	3494	2775			14773
		STD	0700	0397	3494	2776	0004114	0485	14782
		STD	0800	0385	3494	2778	0004068	0526	14794
125		OBS	0825	0382	3494	2778			14797
		STD	0900	0373	3494	2778	0004048	0567	14805
		STD	1000	0363	3493	2779	0004047	0607	14818
125		OBS	T1031	0360	3493	2779			14821
		STD	1100	0359	3493	2779	0004093	0648	14833
		STD	1200	0358	3493	2780	0004148	0689	14849
		STD	1300	0357	3494	2780	0004201	0731	14865
		STD	1400	0356	3494	2780	0004254	0773	14882
		STD	1500	0355	3494	2781	0004304	0816	14898
125		OBS	T1554	0354	3494	2781			14907

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4319 N	04848 W		149	38	04	03	182	1963		8410		13

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		32	F05		-013			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0208	3381	2704	0010335	0000	14570
192		OBS	0000	0208	3381	2704			14570
		STD	0010	0208	3381	2704	0010339	0010	14572
		STD	0020	0208	3381	2704	0010342	0021	14573
192		OBS	0022	0208	3381	2704			14573
		STD	0030	0207	3381	2704	0010308	0031	14574
192		OBS	0044	0205	3382	2705			14576
		STD	0050	0140	3383	2710	0009691	0051	14548
192		OBS	0066	0043	3387	2719			14508
		STD	0075	0061	3396	2726	0008248	0073	14519
192		OBS	0087	0087	3407	2733			14534
		STD	0100	0131	3417	2738	0007093	0093	14557
		STD	0125	0194	3432	2745	0006419	0109	14591
192		OBS	0130	0203	3434	2746			14596
		STD	0150	0210	3438	2749	0006100	0125	14603
192		OBS	T0174	0231	3444	2752			14617
		STD	0200	0305	3458	2757	0005436	0154	14655
		STD	0250	0404	3479	2764	0004880	0180	14709
192		OBS	0260	0417	3482	2765			14716
		STD	0300	0430	3489	2769	0004461	0203	14729
192		OBS	0345	0437	3494	2772			14740
		STD	0400	0418	3494	2774	0004080	0246	14741
		STD	0500	0393	3493	2776	0003947	0286	14747
192		OBS	T0513	0390	3493	2776			14748
		STD	0600	0379	3493	2777	0003930	0325	14758
192		OBS	0681	0372	3492	2777			14768
		STD	0700	0371	3492	2777	0003968	0365	14771
		STD	0800	0368	3492	2778	0004022	0405	14786
192		OBS	T0848	0366	3492	2778			14793
		STD	0900	0364	3492	2778	0004062	0445	14801
		STD	1000	0361	3492	2778	0004112	0486	14817
		STD	1100	0357	3492	2779	0004148	0527	14832
		STD	1200	0353	3491	2778	0004256	0569	14847
192		OBS	T1271	0351	3491	2779			14858

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4305 N	04812 W		149	38	04	03	228	1963		8411		13

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		34	F05		007			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0541	3378	2668	0013673	0000	14711
233		OBS	0000	0541	3378	2668			14711
		STD	0010	0549	3378	2667	0013775	0014	14716
		STD	0020	0555	3378	2667	0013855	0028	14720
233		OBS	0023	0557	3378	2666			14721
		STD	0030	0559	3379	2667	0013850	0041	14723
233		OBS	0046	0565	3381	2668			14728
		STD	0050	0567	3383	2669	0013655	0069	14730
233		OBS	0069	0623	3404	2679			14759
		STD	0075	0683	3418	2682	0012510	0102	14785
233		OBS	0091	0790	3448	2690			14834
		STD	0100	0781	3453	2695	0011282	0131	14832
		STD	0125	0727	3463	2711	0009828	0158	14817
233		OBS	0136	0689	3464	2717			14804
		STD	0150	0591	3458	2725	0008468	0181	14766
233		OBS	T0182	0435	3451	2738			14707
		STD	0200	0456	3459	2742	0006884	0219	14719
		STD	0250	0497	3478	2753	0005981	0251	14747
233		OBS	0270	0505	3483	2756			14754
		STD	0300	0502	3487	2759	0005427	0280	14759
233		OBS	0354	0492	3493	2765			14764
		STD	0400	0474	3494	2768	0004708	0330	14764
		STD	0500	0438	3496	2773	0004259	0375	14766
233		OBS	T0518	0432	3496	2774			14767
		STD	0600	0405	3495	2776	0004036	0417	14769
233		OBS	0691	0382	3494	2778			14774
		STD	0700	0381	3494	2778	0003932	0456	14775
		STD	0800	0366	3493	2779	0003925	0496	14786
233		OBS	T0864	0359	3492	2779			14793
		STD	0900	0358	3492	2779	0003993	0535	14799
		STD	1000	0355	3492	2779	0004044	0576	14814
		STD	1100	0353	3492	2779	0004094	0616	14830
		STD	1200	0350	3492	2780	0004142	0657	14845
		STD	1300	0347	3492	2780	0004189	0699	14861
233		OBS	T1334	0346	3492	2780			14866

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	42515N	04736 W		149	27	04	04	039	1963		8412		17

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		29	F05		011			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0602	3390	2670	0013482	0000	14737
039		OBS	0000	0602	3390	2670			14737
		STD	0010	0602	3390	2670	0013500	0013	14739
		STD	0020	0603	3390	2670	0013517	0027	14741
039		OBS	0028	0603	3390	2670			14742
		STD	0030	0603	3390	2670	0013528	0041	14742
		STD	0050	0605	3391	2671	0013520	0068	14746
039		OBS	0054	0605	3391	2671			14747
		STD	0075	0519	3392	2682	0012461	0100	14716
039		OBS	0082	0508	3394	2685			14713
		STD	0100	0527	3402	2689	0011831	0130	14725
039		OBS	0108	0541	3407	2691			14732
		STD	0125	0616	3431	2701	0010783	0159	14769
		STD	0150	0697	3458	2711	0009833	0184	14808
039		OBS	0163	0722	3469	2716			14822
		STD	0200	0717	3483	2728	0008328	0230	14828
039		OBS	T0217	0704	3487	2733			14826
		STD	0250	0601	3483	2744	0006838	0268	14790
		STD	0300	0491	3478	2753	0005969	0300	14753
055		OBS	T0328	0453	3475	2755			14741
		STD	0400	0467	3488	2764	0005059	0355	14761
055		OBS	0438	0470	3493	2768			14769
		STD	0500	0458	3494	2770	0004633	0403	14774
		STD	0600	0440	3495	2773	0004424	0449	14784
055		OBS	T0658	0429	3496	2774			14789
		STD	0700	0419	3496	2775	0004235	0492	14792
		STD	0800	0400	3495	2777	0004139	0534	14800
055		OBS	0878	0390	3495	2778			14809
		STD	0900	0390	3495	2778	0004144	0575	14813
		STD	1000	0388	3495	2778	0004211	0617	14828
		STD	1100	0385	3495	2778	0004265	0659	14844
055		OBS	T1100	0385	3495	2778			14844
		STD	1200	0381	3495	2779	0004289	0702	14859
		STD	1300	0377	3495	2779	0004311	0745	14874
		STD	1400	0372	3496	2780	0004326	0788	14889
		STD	1500	0366	3496	2781	0004319	0832	14903
055		OBS	T1660	0354	3496	2782			14925

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4236 N	04654 W		149	26	04	04	080	1963		8413		16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		32	F05		034			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10[7]	Σ ΔD DYN. M. X 10[3]	SOUND VELOCITY
		STD	0000	1282	3556	2688	0011800	0000	15010
090		OBS	0000	1282	3556	2688			15010
		STD	0010	1289	3556	2687	0011961	0012	15014
		STD	0020	1293	3556	2686	0012065	0024	15017
090		OBS	0028	1295	3556	2685			15019
		STD	0030	1295	3556	2685	0012127	0036	15019
		STD	0050	1293	3556	2686	0012139	0060	15021
090		OBS	0055	1292	3556	2686			15022
		STD	0075	1293	3556	2686	0012210	0091	15026
090		OBS	0082	1293	3556	2686			15027
		STD	0100	1292	3556	2686	0012272	0121	15030
090		OBS	0110	1292	3556	2686			15031
		STD	0125	1291	3556	2686	0012311	0152	15033
		STD	0150	1289	3556	2687	0012342	0183	15037
090		OBS	0164	1288	3556	2687			15039
		STD	0200	1217	3539	2688	0012351	0245	15018
090		OBS	T0219	1179	3533	2690			15007
		STD	0250	1127	3533	2700	0011266	0304	14994
		STD	0300	1020	3528	2715	0009877	0356	14964
096		OBS	T0311	0993	3526	2719			14956
		STD	0400	0708	3493	2737	0007786	0445	14858
096		OBS	0416	0669	3489	2740			14845
		STD	0500	0613	3496	2753	0006411	0516	14838
		STD	0600	0555	3502	2765	0005340	0575	14832
096		OBS	T0637	0537	3503	2768			14831
		STD	0700	0512	3502	2770	0004883	0626	14831
		STD	0800	0476	3501	2774	0004618	0673	14833
096		OBS	0840	0463	3501	2775			14834
		STD	0900	0446	3500	2776	0004447	0718	14837
		STD	1000	0421	3499	2777	0004348	0762	14843
096		OBS	T1038	0413	3498	2778			14846
		STD	1100	0408	3497	2778	0004401	0806	14854
		STD	1200	0400	3496	2778	0004465	0851	14867
		STD	1300	0392	3496	2778	0004452	0895	14880
		STD	1400	0384	3496	2779	0004437	0940	14894
		STD	1500	0375	3496	2780	0004417	0984	14907
096		OBS	T1565	0370	3496	2781			14916

731-298 O—64——8

SHIP CODE	LATITUDE ° ' 1/10	LONGITUDE ° ' 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4221 N	04612 W		149	26	04	04	130	1963		8414		15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		34	F04		058			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1398	3581	2683	0012237	0000	15051
157		OBS	0000	1398	3581	2683			15051
		STD	0010	1397	3581	2684	0012221	0012	15053
		STD	0020	1397	3582	2684	0012207	0024	15054
157		OBS	0026	1396	3582	2685			15055
		STD	0030	1396	3582	2685	0012218	0037	15056
		STD	0050	1398	3582	2684	0012306	0061	15059
157		OBS	0052	1398	3582	2684			15060
		STD	0075	1395	3582	2685	0012331	0092	15063
157		OBS	0078	1395	3582	2685			15063
		STD	0100	1392	3581	2685	0012393	0123	15066
157		OBS	0104	1391	3581	2685			15066
		STD	0125	1389	3580	2685	0012485	0154	15068
		STD	0150	1386	3579	2685	0012571	0185	15071
157		OBS	0156	1385	3578	2684			15072
		STD	0200	1355	3571	2685	0012681	0248	15069
157		OBS	T0208	1350	3570	2685			15068
		STD	0250	1339	3565	2683	0012940	0312	15071
		STD	0300	1296	3557	2686	0012811	0377	15064
157		OBS	0309	1285	3556	2687			15061
		STD	0400	1111	3539	2708	0010898	0495	15014
157		OBS	0407	1098	3538	2709			15011
		STD	0500	0901	3519	2728	0008980	0595	14952
157		OBS	T0597	0726	3505	2744			14900
		STD	0600	0720	3505	2745	0007396	0677	14898
		STD	0700	0562	3495	2756	0006079	0744	14850
		STD	0800	0464	3491	2767	0005237	0801	14826
157		OBS	0800	0464	3491	2767			14826
		STD	0900	0459	3495	2771	0004952	0852	14841
		STD	1000	0453	3500	2775	0004666	0900	14856
157		OBS	T1005	0453	3500	2775			14857
		STD	1100	0445	3499	2775	0004700	0946	14869
		STD	1200	0434	3499	2776	0004718	0994	14881
		STD	1300	0420	3498	2777	0004692	1041	14892
		STD	1400	0405	3497	2778	0004649	1087	14903
		STD	1500	0387	3496	2779	0004562	1133	14912
157		OBS	T1517	0384	3496	2779			14913

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	42455N	04545 W		149	25	04	04	191	1963		8415	4940	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		32	F05		039			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1553	3612	2673	0013196	0000	15104
204		OBS	0000	1553	3612	2673			15104
		STD	0010	1553	3612	2673	0013237	0013	15106
		STD	0020	1554	3612	2673	0013275	0026	15108
204		OBS	0027	1554	3612	2673			15109
		STD	0030	1554	3612	2673	0013315	0040	15110
		STD	0050	1555	3612	2673	0013396	0066	15113
204		OBS	0054	1555	3612	2673			15114
		STD	0075	1555	3612	2673	0013477	0100	15117
204		OBS	0080	1555	3612	2673			15118
		STD	0100	1557	3612	2673	0013588	0134	15122
204		OBS	0107	1557	3612	2672			15123
		STD	0125	1557	3612	2672	0013678	0168	15126
		STD	0150	1556	3612	2673	0013735	0202	15130
204		OBS	0159	1555	3612	2673			15131
		STD	0200	1551	3612	2674	0013787	0271	15136
204		OBS	T0213	1550	3612	2674			15138
		STD	0250	1480	3596	2677	0013577	0339	15120
		STD	0300	1384	3577	2683	0013112	0406	15095
209		OBS	0310	1364	3574	2685			15090
209		OBS	0398	1188	3551	2703			15042
		STD	0400	1183	3550	2703	0011418	0529	15041
		STD	0500	0928	3522	2726	0009202	0632	14962
209		OBS	T0555	0797	3509	2737			14920
		STD	0600	0654	3495	2746	0007190	0714	14870
		STD	0700	0451	3479	2759	0005861	0779	14803
209		OBS	0731	0421	3478	2761			14795
		STD	0800	0477	3491	2765	0005414	0836	14832
		STD	0900	0533	3509	2773	0004884	0887	14874
209		OBS	T0903	0534	3510	2774			14875
		STD	1000	0505	3508	2775	0004773	0935	14879
		STD	1100	0476	3505	2776	0004685	0983	14883
		STD	1200	0446	3502	2778	0004593	1029	14887
		STD	1300	0416	3500	2779	0004489	1074	14891
209		OBS	T1368	0396	3498	2780			14894

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	43105N	04520 W		149	35	04	05	005	1963		8416		13

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		02	F02		035			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1497	3608	2683	0012298	0000	15086
011		OBS	0000	1497	3608	2683			15086
		STD	0010	1502	3608	2681	0012463	0012	15089
		STD	0020	1506	3607	2680	0012608	0025	15092
011		OBS	0024	1507	3607	2680			15093
		STD	0030	1507	3607	2680	0012681	0038	15094
011		OBS	0047	1508	3607	2680			15097
		STD	0050	1508	3607	2680	0012751	0063	15098
011		OBS	0071	1508	3608	2680			15101
		STD	0075	1509	3608	2680	0012762	0095	15102
011		OBS	0094	1510	3610	2681			15106
		STD	0100	1509	3610	2682	0012724	0127	15107
		STD	0125	1507	3610	2682	0012743	0159	15110
011		OBS	0141	1505	3609	2682			15112
		STD	0150	1499	3608	2682	0012802	0191	15111
011		OBS	T0188	1467	3601	2684			15107
		STD	0200	1455	3597	2684	0012829	0255	15104
		STD	0250	1386	3582	2687	0012645	0318	15088
011		OBS	0279	1334	3572	2690			15075
		STD	0300	1281	3564	2694	0012007	0380	15059
011		OBS	0367	1119	3541	2708			15012
		STD	0400	1031	3532	2717	0009996	0490	14985
		STD	0500	0807	3512	2738	0008012	0580	14916
011		OBS	T0537	0742	3507	2743			14896
		STD	0600	0663	3507	2754	0006460	0652	14876
		STD	0700	0566	3506	2766	0005319	0711	14853
011		OBS	0706	0561	3506	2767			14852
		STD	0800	0514	3502	2770	0005058	0763	14848
011		OBS	T0871	0483	3500	2772			14847
		STD	0900	0471	3499	2772	0004842	0813	14847
		STD	1000	0435	3496	2774	0004715	0860	14848
		STD	1100	0406	3494	2775	0004597	0907	14852
		STD	1200	0385	3493	2777	0004501	0952	14860
		STD	1300	0370	3492	2778	0004474	0997	14871
011		OBS	T1339	0366	3492	2778			14875

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4320 N	04600 W		149	36	04	05	050	1963		8417		15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F01		036			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1234	3547	2691	0011559	0000	14992
059		OBS	0000	1234	3547	2691			14992
		STD	0010	1234	3547	2691	0011585	0012	14994
		STD	0020	1234	3547	2691	0011611	0023	14996
059		OBS	0026	1234	3547	2691			14997
		STD	0030	1233	3547	2691	0011634	0035	14997
		STD	0050	1230	3546	2691	0011688	0058	14999
059		OBS	0052	1230	3546	2691			14999
		STD	0075	1226	3544	2690	0011813	0087	15001
059		OBS	0078	1225	3544	2690			15002
		STD	0100	1221	3543	2690	0011859	0117	15004
059		OBS	0105	1220	3543	2690			15004
		STD	0125	1215	3542	2690	0011915	0147	15006
		STD	0150	1210	3540	2690	0011989	0177	15008
059		OBS	0156	1209	3540	2690			15008
		STD	0200	1207	3539	2690	0012150	0237	15015
059		OBS	T0208	1204	3539	2690			15015
		STD	0250	1171	3538	2696	0011713	0297	15010
		STD	0300	1106	3536	2707	0010760	0353	14996
059		OBS	0313	1084	3536	2710			14990
		STD	0400	0876	3514	2729	0008750	0450	14926
059		OBS	0416	0844	3511	2731			14916
		STD	0500	0724	3508	2747	0007069	0530	14883
		STD	0600	0613	3506	2760	0005813	0594	14856
059		OBS	T0623	0592	3505	2762			14851
		STD	0700	0546	3504	2767	0005211	0649	14845
		STD	0800	0498	3502	2772	0004823	0699	14842
059		OBS	0828	0486	3502	2773			14841
		STD	0900	0464	3500	2774	0004680	0747	14844
		STD	1000	0437	3499	2776	0004518	0793	14849
059		OBS	T1032	0429	3498	2776			14851
		STD	1100	0414	3497	2777	0004476	0838	14856
		STD	1200	0396	3496	2778	0004417	0882	14865
		STD	1300	0383	3495	2779	0004416	0926	14876
		STD	1400	0374	3494	2779	0004462	0971	14889
		STD	1500	0370	3494	2779	0004495	1015	14905
059		OBS	T1549	0370	3494	2779			14913

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	43305N	04640 W		149	36	04	05	082	1963		8418		15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
					063			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0666	3410	2678	0012777	0000	14765
097	OBS	0000	0666	3410	2678			14765
	STD	0010	0667	3410	2678	0012804	0013	14767
	STD	0020	0668	3410	2677	0012832	0026	14769
097	OBS	0025	0669	3410	2677			14771
	STD	0030	0670	3410	2677	0012847	0038	14772
	STD	0050	0676	3412	2678	0012829	0064	14778
097	OBS	0050	0676	3412	2678			14778
	STD	0075	0799	3436	2681	0012609	0096	14833
097	OBS	0085	0905	3463	2684			14878
	STD	0100	1126	3517	2688	0012060	0127	14967
097	OBS	0100	1126	3517	2688			14967
	STD	0125	1084	3509	2689	0011973	0157	14956
097	OBS	0149	1038	3503	2693			14942
	STD	0150	1035	3503	2693	0011635	0186	14942
097	OBS	T0199	0927	3498	2708			14909
	STD	0200	0927	3498	2708	0010332	0241	14910
	STD	0250	0895	3503	2717	0009565	0291	14907
	STD	0300	0819	3508	2733	0008138	0335	14887
097	OBS	0302	0815	3506	2733			14886
	STD	0400	0525	3483	2753	0006120	0407	14784
097	OBS	T0406	0512	3482	2754			14780
	STD	0500	0483	3488	2762	0005367	0464	14784
	STD	0600	0457	3494	2770	0004707	0514	14791
106	OBS	T0614	0454	3495	2771			14792
	STD	0700	0437	3495	2773	0004507	0560	14799
	STD	0800	0418	3495	2775	0004382	0605	14808
106	OBS	0814	0416	3495	2775			14809
	STD	0900	0401	3495	2776	0004304	0648	14817
	STD	1000	0387	3494	2777	0004266	0691	14828
106	OBS	T1013	0385	3494	2778			14829
	STD	1100	0375	3494	2779	0004217	0734	14839
	STD	1200	0366	3493	2779	0004266	0776	14852
	STD	1300	0359	3493	2779	0004263	0819	14866
	STD	1400	0356	3493	2780	0004308	0861	14882
	STD	1500	0355	3493	2780	0004376	0905	14898
106	OBS	T1523	0355	3493	2780			14902

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4343 N	04719 W		149	37	04	05	135	1963		8419	4020	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F06		067			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0482	3388	2683	0012277	0000	14688
149		OBS	0000	0482	3388	2683			14688
		STD	0010	0475	3388	2684	0012213	0012	14687
		STD	0020	0463	3386	2685	0012097	0024	14683
149		OBS	0026	0454	3386	2686			14680
		STD	0030	0450	3386	2686	0011979	0036	14679
		STD	0050	0402	3387	2691	0011574	0060	14662
149		OBS	0052	0395	3387	2692			14660
		STD	0075	0273	3383	2699	0010758	0088	14611
149		OBS	0078	0260	3382	2700			14606
		STD	0100	0241	3383	2702	0010485	0114	14601
149		OBS	0103		3383				
		STD	0125	0219	3396	2715	0009334	0139	14597
		STD	0150	0198	3413	2730	0007891	0161	14594
149		OBS	0154	0194	3416	2733			14594
		STD	0200	0396	3458	2748	0006325	0196	14694
149		OBS	T0206	0415	3462	2749			14704
		STD	0250	0434	3473	2756	0005649	0226	14720
		STD	0300	0449	3483	2762	0005119	0253	14736
149		OBS	0309	0451	3484	2763			14739
		STD	0400	0455	3493	2769	0004543	0301	14756
149		OBS	0412	0455	3494	2770			14759
		STD	0500	0438	3495	2773	0004319	0346	14766
		STD	0600	0423	3496	2775	0004182	0388	14777
149		OBS	T0618	0421	3496	2775			14779
		STD	0700	0417	3496	2776	0004168	0430	14791
		STD	0800	0408	3497	2777	0004122	0471	14804
149		OBS	0825	0405	3497	2778			14806
		STD	0900	0389	3495	2778	0004125	0513	14812
		STD	1000	0371	3493	2778	0004178	0554	14821
149		OBS	T1028	0367	3492	2778			14824
		STD	1100	0365	3492	2778	0004221	0596	14835
		STD	1200	0362	3493	2779	0004242	0639	14851
		STD	1300	0359	3493	2779	0004261	0681	14866
		STD	1400	0357	3494	2780	0004278	0724	14882
		STD	1500	0354	3494	2781	0004294	0767	14898
149		OBS	T1530	0353	3494	2781			14902

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4351 N	04756 W		149	37	04	05	181	1963		8420		16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		14	F07		091			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0530	3384	2674	0013100	0000	14707
189		OBS	0000	0530	3384	2674			14707
		STD	0010	0531	3385	2675	0013060	0013	14709
		STD	0020	0532	3386	2675	0013027	0026	14711
189		OBS	0026	0532	3386	2676			14712
		STD	0030	0535	3387	2676	0012964	0039	14714
		STD	0050	0550	3397	2682	0012405	0064	14725
189		OBS	0052	0551	3398	2683			14726
		STD	0075	0517	3423	2707	0010117	0093	14719
189		OBS	0078	0514	3426	2709			14719
		STD	0100	0503	3440	2722	0008716	0116	14720
189		OBS	0104	0501	3442	2724			14720
		STD	0125	0500	3455	2734	0007588	0137	14725
		STD	0150	0496	3468	2745	0006600	0154	14729
189		OBS	0156	0494	3470	2747			14729
		STD	0200	0475	3481	2757	0005449	0184	14730
189		OBS	T0208	0473	3483	2759			14731
		STD	0250	0475	3490	2765	0004833	0210	14740
		STD	0300	0477	3495	2768	0004544	0234	14750
189		OBS	0313	0478	3496	2769			14752
		STD	0400	0453	3496	2772	0004302	0278	14756
189		OBS	0418	0449	3496	2772			14757
		STD	0500	0433	3496	2774	0004150	0320	14764
		STD	0600	0416	3497	2777	0004020	0361	14774
189		OBS	T0629	0412	3497	2777			14777
		STD	0700	0404	3497	2778	0003994	0401	14785
		STD	0800	0394	3496	2778	0004010	0441	14798
189		OBS	0835	0390	3496	2779			14802
		STD	0900	0382	3495	2779	0004042	0481	14809
		STD	1000	0372	3494	2779	0004123	0522	14821
189		OBS	T1039	0369	3493	2778			14827
		STD	1100	0367	3493	2779	0004193	0564	14836
		STD	1200	0364	3493	2779	0004236	0606	14851
		STD	1300	0360	3493	2779	0004277	0648	14867
		STD	1400	0357	3493	2780	0004316	0691	14882
		STD	1500	0353	3493	2780	0004354	0735	14897
189		OBS	T1566	0351	3493	2780			14908

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	43585N	04829 W		149	38	04	05	222	1963		8421	3200	14

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		20	F03		053			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0606	3419	2693	0011361	0000	14743
229		OBS	0000	0606	3419	2693			14743
		STD	0010	0606	3420	2693	0011320	0011	14744
		STD	0020	0607	3421	2694	0011271	0023	14746
229		OBS	0024	0607	3421	2694			14747
		STD	0030	0607	3421	2694	0011264	0034	14748
229		OBS	0048	0607	3421	2694			14751
		STD	0050	0607	3421	2694	0011284	0056	14751
229		OBS	0072	0607	3422	2695			14755
		STD	0075	0605	3422	2695	0011211	0085	14755
229		OBS	0096	0604	3424	2697			14758
		STD	0100	0614	3428	2699	0010922	0112	14763
		STD	0125	0653	3446	2708	0010109	0139	14785
229		OBS	0143	0658	3456	2715			14792
		STD	0150	0645	3457	2718	0009223	0163	14788
229		OBS	T0191	0580	3465	2732			14770
		STD	0200	0569	3467	2735	0007594	0205	14767
		STD	0250	0517	3476	2749	0006363	0240	14755
229		OBS	0285	0491	3481	2756			14751
		STD	0300	0487	3483	2758	0005550	0269	14752
229		OBS	0377	0467	3491	2766			14757
		STD	0400	0462	3492	2768	0004704	0321	14759
		STD	0500	0439	3495	2773	0004323	0366	14767
229		OBS	T0558	0427	3496	2775			14771
		STD	0600	0417	3496	2775	0004128	0408	14774
		STD	0700	0397	3495	2777	0004077	0449	14782
229		OBS	0745	0390	3494	2777			14787
		STD	0800	0383	3494	2778	0004067	0490	14793
		STD	0900	0373	3493	2778	0004077	0531	14805
229		OBS	T0934	0370	3493	2778			14810
		STD	1000	0368	3493	2779	0004119	0572	14820
		STD	1100	0365	3493	2779	0004166	0613	14835
		STD	1200	0362	3493	2779	0004211	0655	14850
		STD	1300	0358	3493	2779	0004255	0697	14866
		STD	1400	0355	3493	2780	0004298	0740	14881
229		OBS	T1436	0354	3493	2780			14887

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4403 N	04847 W		149	48	04	06	015	1963		8422	1510	12

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		16	F04		005			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0124	3311	2665	0013975	0000	14409
025		OBS	0000	-0124	3311	2665			14409
		STD	0010	-0126	3312	2666	0013925	0014	14410
		STD	0020	-0128	3312	2666	0013875	0028	14411
025		OBS	0021	-0128	3312	2666			14411
		STD	0030	-0129	3314	2668	0013712	0042	14412
025		OBS	0044	-0130	3317	2670			14414
		STD	0050	-0128	3319	2672	0013319	0069	14417
025		OBS	0065	-0122	3324	2676			14423
		STD	0075	-0112	3336	2685	0012049	0100	14431
025		OBS	0087	-0088	3351	2696			14446
		STD	0100	-0017	3368	2707	0009971	0128	14483
		STD	0125	0091	3395	2723	0008506	0151	14540
025		OBS	0130	0108	3399	2725			14549
		STD	0150	0150	3412	2733	0007616	0171	14573
025		OBS	T0174	0192	3425	2740			14598
		STD	0200	0215	3433	2745	0006540	0207	14613
		STD	0250	0255	3447	2752	0005847	0238	14641
025		OBS	0254	0258	3448	2753			14643
		STD	0300	0290	3458	2758	0005367	0266	14665
025		OBS	0330	0308	3463	2760			14679
		STD	0400	0335	3473	2766	0004751	0316	14703
025		OBS	T0468	0356	3481	2770			14725
		STD	0500	0364	3484	2772	0004312	0361	14734
		STD	0600	0380	3489	2774	0004202	0404	14758
025		OBS	0620	0381	3490	2775			14762
		STD	0700	0375	3490	2775	0004161	0446	14772
025		OBS	T0769	0370	3490	2776			14782
		STD	0800	0370	3490	2776	0004180	0488	14787
		STD	0900	0368	3490	2776	0004234	0530	14803
		STD	1000	0366	3491	2777	0004286	0572	14819
		STD	1100	0365	3491	2777	0004337	0615	14835
		STD	1200	0363	3491	2777	0004379	0659	14851
025		OBS	T1215	0363	3491	2777			14853

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4406 N	04856 W		149	48	04	06	038	1963		8423	0640	05

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		22	F03		006			

MESSENGER TIME HR 1/10	or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0107	3319	2671	0013411	0000	14418
046		OBS	0000	-0107	3319	2671			14418
		STD	0010	-0108	3319	2671	0013372	0013	14419
		STD	0020	-0109	3320	2672	0013333	0027	14421
046		OBS	0025	-0109	3320	2672			14421
		STD	0030	-0108	3321	2673	0013237	0040	14423
		STD	0050	-0105	3324	2675	0013005	0066	14428
046		OBS	0050	-0105	3324	2675			14428
		STD	0075	-0108	3326	2677	0012828	0099	14431
046		OBS	0075	-0108	3326	2677			14431
		STD	0100	-0085	3334	2682	0012282	0130	14447
046		OBS	0123	-0064	3343	2689			14462
		STD	0125	-0063	3344	2690	0011592	0160	14463
		STD	0150	-0044	3357	2699	0010672	0188	14478
046		OBS	T0173	-0018	3369	2708			14495
		STD	0200	0054	3386	2718	0008966	0237	14535
		STD	0250	0156	3412	2732	0007686	0278	14592
046		OBS	0268	0183	3419	2736			14608
		STD	0300	0206	3428	2741	0006888	0315	14625
046		OBS	0358	0240	3441	2749			14651
		STD	0400	0259	3448	2753	0005894	0379	14667
		STD	0500	0284	3456	2757	0005591	0436	14696
046		OBS	T0529	0286	3456	2757			14701

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	4409 N	04902 W		149	49	04	06	061	1963		8424	0175	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		22	F03		001			

MESSENGER TIME HR 1/10	or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0105	3315	2668	0013724	0000	14419
064		OBS	0000	-0105	3315	2668			14419
		STD	0010	-0105	3316	2668	0013655	0014	14420
		STD	0020	-0106	3317	2669	0013579	0027	14422
064		OBS	0024	-0106	3317	2669			14422
		STD	0030	-0106	3317	2670	0013535	0041	14423
064		OBS	0049	-0106	3318	2670			14427
		STD	0050	-0106	3318	2670	0013462	0068	14427
064		OBS	0073	-0106	3319	2671			14431
		STD	0075	-0106	3319	2671	0013371	0101	14431
064		OBS	0097	-0106	3319	2671			14435
		STD	0100	-0105	3320	2672	0013299	0135	14436
		STD	0125	-0097	3327	2677	0012779	0167	14445
064		OBS	T0147	-0089	3335	2682			14453

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4411 N	04910 W		149	49	04	06	079	1963		8425	0095	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		003			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0102	3317	2669	0013580	0000	14420
082	OBS	0000	-0102	3317	2669			14420
	STD	0010	-0103	3317	2669	0013602	0014	14421
	STD	0020	-0104	3316	2669	0013624	0027	14423
082	OBS	0025	-0104	3316	2669			14423
	STD	0030	-0103	3316	2669	0013621	0041	14425
082	OBS	0049	-0102	3317	2669			14428
	STD	0050	-0102	3317	2669	0013551	0068	14428
082	OBS	T0074	-0106	3318	2670			14431

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4414 N	04923 W		149	49	04	06	092	1963		8426	0054	00

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F03		011			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0080	3319	2670	0013498	0000	14431
094	OBS	0000	-0080	3319	2670			14431
	STD	0010	-0082	3320	2671	0013449	0013	14432
	STD	0020	-0083	3320	2671	0013401	0027	14433
094	OBS	0020	-0083	3320	2671			14433
	STD	0030	-0076	3322	2672	0013267	0040	14438
094	OBS	T0040	-0063	3324	2674			14446

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44595N	04923 W		149	49	04	06	137	1963		8427	0053	00

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F02		016			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0069	3307	2660	0014455	0000	14434
140	OBS	0000	-0069	3307	2660			14434
	STD	0010	-0076	3307	2660	0014465	0014	14433
	STD	0020	-0082	3306	2660	0014468	0029	14431
140	OBS	0021	-0083	3306	2660			14431
	STD	0030	-0083	3306	2660	0014437	0043	14433
140	OBS	T0042	-0083	3307	2661			14435

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44565N	04910 W		149	49	04	06	153	1963		8428	0210	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F01		014			

MESSENGER TIME HR. 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0093	3310	2663	0014145	0000	14423
156	OBS	0000	-0093	3310	2663			14423
	STD	0010	-0101	3310	2664	0014114	0014	14421
	STD	0020	-0107	3310	2664	0014089	0028	14420
156	OBS	0026	-0110	3310	2664			14420
	STD	0030	-0111	3310	2664	0014057	0042	14420
	STD	0050	-0113	3311	2665	0013985	0070	14423
156	OBS	0052	-0113	3311	2665			14423
	STD	0075	-0113	3312	2666	0013885	0105	14427
156	OBS	T0078	-0113	3312	2666			14427

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4455 N	04900 W		149	49	04	06	185	1963		8429	0626	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		22	F03		015			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN M. X 10^3	SOUND VELOCITY
		STD	0000	-0098	3303	2658	0014666	0000	14420
190		OBS	0000	-0098	3303	2658			14420
		STD	0010	-0108	3311	2665	0014015	0014	14418
		STD	0020	-0115	3317	2670	0013528	0028	14417
190		OBS	0025	-0117	3319	2671			14418
		STD	0030	-0116	3320	2672	0013288	0042	14419
		STD	0050	-0114	3323	2675	0013053	0068	14424
190		OBS	0050	-0114	3323	2675			14424
		STD	0075	-0108	3326	2677	0012828	0100	14431
190		OBS	0075	-0108	3326	2677			14431
		STD	0100	-0096	3332	2681	0012396	0132	14442
190		OBS	0100	-0096	3332	2681			14442
		STD	0125	-0069	3340	2687	0011873	0162	14459
		STD	0150	-0019	3353	2695	0011091	0191	14489
190		OBS	0151	-0017	3354	2696			14490
		STD	0200	0146	3394	2718	0008961	0241	14577
190		OBS	T0201	0148	3395	2719			14578
		STD	0250	0166	3407	2727	0008139	0284	14596
190		OBS	0298	0185	3418	2735			14614
		STD	0300	0186	3418	2735	0007450	0323	14615
190		OBS	0392	0225	3436	2746			14649
		STD	0400	0229	3438	2747	0006377	0392	14653
		STD	0500	0294	3461	2760	0005314	0450	14701
190		OBS	T0552	0336	3474	2767			14729

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44515N	04846 W		149	48	04	06	201	1963		8430	1510	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		22	F02					

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0073	3327	2676	0012909	0000	14435
206		OBS	0000	-0073	3327	2676			14435
		STD	0010	-0091	3327	2677	0012843	0013	14428
		STD	0020	-0103	3327	2677	0012798	0026	14424
206		OBS	0023	-0106	3327	2678			14424
		STD	0030	-0107	3327	2678	0012757	0038	14424
206		OBS	0047	-0109	3328	2678			14426
		STD	0050	-0109	3328	2679	0012678	0064	14427
206		OBS	0070	-0110	3329	2679			14430
		STD	0075	-0110	3329	2679	0012577	0095	14431
206		OBS	0093	-0110	3330	2680			14434
		STD	0100	-0070	3343	2689	0011651	0126	14455
		STD	0125	0051	3382	2715	0009255	0152	14520
206		OBS	0139	0104	3399	2725			14549
		STD	0150	0131	3407	2730	0007862	0173	14564
206		OBS	T0186	0204	3430	2743			14605
		STD	0200	0221	3435	2746	0006438	0209	14616
		STD	0250	0272	3452	2755	0005621	0239	14649
206		OBS	0279	0296	3460	2759			14665
		STD	0300	0308	3464	2761	0005085	0266	14674
206		OBS	0372	0344.	3476	2767			14703
		STD	0400	0353	3478	2768	0004560	0314	14712
		STD	0500	0375	3485	2771	0004355	0359	14738
206		OBS	T0558	0383	3488	2773			14752
		STD	0600	0383	3489	2773	0004272	0402	14759
		STD	0700	0382	3490	2774	0004270	0445	14775
206		OBS	0739	0381	3490	2775			14781
		STD	0800	0377	3490	2775	0004273	0487	14790
		STD	0900	0371	3490	2776	0004291	0530	14804
206		OBS	T0919	0370	3490	2776			14807
		STD	1000	0366	3490	2776	0004318	0573	14818
		STD	1100	0362	3490	2777	0004355	0617	14834
		STD	1200	0358	3490	2777	0004390	0660	14849
		STD	1300	0356	3490	2777	0004447	0704	14864
206		OBS	T1395	0354	3490	2776			14880

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44505N	04834 W		149	48	04	06	222	1963		8431	1740	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		29	F02		001			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0007	3351	2693	0011339	0000	14469
229		OBS	0000	-0007	3351	2693			14469
		STD	0010	-0025	3352	2694	0011196	0011	14463
		STD	0020	-0034	3353	2695	0011101	0022	14460
229		OBS	0026	-0035	3353	2696			14461
		STD	0030	-0030	3355	2697	0010930	0033	14464
		STD	0050	-0007	3365	2704	0010290	0055	14479
229		OBS	0053	-0003	3366	2705			14482
		STD	0075	0123	3416	2738	0007110	0076	14549
229		OBS	0078	0134	3420	2740			14555
		STD	0100	0162	3427	2744	0006551	0093	14572
229		OBS	0105	0168	3429	2745			14576
		STD	0125	0192	3436	2749	0006101	0109	14591
		STD	0150	0224	3445	2753	0005684	0124	14610
229		OBS	0157	0233	3448	2755			14616
		STD	0200	0295	3463	2762	0004969	0151	14652
229		OBS	T0209	0306	3466	2763			14658
		STD	0250	0342	3477	2768	0004400	0174	14682
		STD	0300	0372	3485	2772	0004145	0195	14704
229		OBS	0312	0377	3487	2773			14709
		STD	0400	0382	3490	2774	0003998	0236	14726
229		OBS	0413	0383	3490	2775			14728
		STD	0500	0379	3490	2775	0004026	0276	14741
		STD	0600	0375	3490	2775	0004072	0317	14756
229		OBS	T0613	0374	3490	2776			14757
		STD	0700	0371	3490	2776	0004087	0358	14771
		STD	0800	0368	3491	2777	0004103	0399	14786
229		OBS	0815	0367	3491	2777			14788
		STD	0900	0364	3491	2777	0004166	0440	14801
		STD	1000	0361	3490	2777	0004252	0482	14816
229		OBS	T1016	0360	3490	2777			14819
		STD	1100	0358	3490	2777	0004293	0525	14832
		STD	1200	0355	3490	2778	0004324	0568	14847
		STD	1300	0353	3491	2778	0004366	0611	14863
		STD	1400	0351	3491	2778	0004406	0655	14879
		STD	1500	0349	3491	2779	0004446	0699	14895
229		OBS	T1524	0349	3491	2779			14899

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	4445 N	04800 W		149	48	04	07	020	1963		8432	3160	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		29	F02		021			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0416	3406	2704	0010246	0000	14663
026	OBS	0000	0416	3406	2704			14663
	STD	0010	0372	3402	2706	0010131	0010	14645
	STD	0020	0341	3399	2706	0010078	0020	14633
026	OBS	0024	0332	3398	2706			14630
	STD	0030	0329	3398	2707	0010038	0030	14630
026	OBS	0049	0324	3399	2708			14631
	STD	0050	0324	3399	2708	0009931	0050	14631
026	OBS	0073	0324	3403	2711			14635
	STD	0075	0312	3403	2713	0009524	0075	14630
026	OBS	0098	0229	3408	2723			14599
	STD	0100	0238	3411	2725	0008339	0097	14604
	STD	0125	0338	3439	2738	0007116	0116	14655
026	OBS	0145	0397	3456	2746			14685
	STD	0150	0405	3458	2747	0006368	0133	14690
026	OBS	T0194	0460	3474	2754			14722
	STD	0200	0461	3476	2755	0005662	0163	14724
	STD	0250	0465	3486	2763	0005015	0190	14735
026	OBS	0292	0468	3492	2767			14744
	STD	0300	0465	3492	2767	0004612	0214	14744
026	OBS	0389	0439	3495	2773			14748
	STD	0400	0437	3495	2773	0004188	0258	14749
	STD	0500	0421	3496	2775	0004073	0299	14759
026	OBS	T0584	0407	3496	2777			14767
	STD	0600	0403	3496	2777	0003938	0339	14768
	STD	0700	0382	3493	2777	0004017	0379	14776
026	OBS	0777	0372	3492	2777			14784
	STD	0800	0371	3492	2777	0004056	0419	14788
	STD	0900	0368	3492	2778	0004108	0460	14803
026	OBS	T0969	0366	3492	2778			14814
	STD	1000	0365	3492	2778	0004159	0502	14818
	STD	1100	0362	3492	2778	0004208	0543	14834
	STD	1200	0358	3492	2779	0004242	0586	14849
	STD	1300	0355	3492	2779	0004288	0628	14864
	STD	1400	0351	3492	2779	0004318	0671	14879
026	OBS	T1467	0349	3492	2780			14890

731-298 O—64——9

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4440 N	04720 W		149	47	04	07	064	1963		8433	3800	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS
		34	F02		022			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0576	3416	2694	0011229	0000	14730
072		OBS	0000	0576	3416	2694			14730
		STD	0010	0576	3416	2694	0011242	0011	14732
		STD	0020	0576	3416	2694	0011254	0022	14733
072		OBS	0025	0576	3416	2694			14734
		STD	0030	0576	3416	2694	0011254	0034	14735
		STD	0050	0577	3417	2695	0011230	0056	14739
072		OBS	0051	0577	3417	2695			14739
		STD	0075	0576	3417	2695	0011250	0084	14742
072		OBS	0076	0576	3417	2695			14743
		STD	0100	0586	3426	2701	0010732	0112	14752
072		OBS	0102	0587	3427	2701			14753
		STD	0125	0534	3434	2713	0009547	0137	14736
		STD	0150	0508	3444	2724	0008531	0160	14731
072		OBS	0152	0507	3445	2725			14731
		STD	0200	0556	3470	2739	0007213	0199	14762
072		OBS	T0203	0558	3471	2740			14763
		STD	0250	0529	3479	2750	0006281	0233	14760
		STD	0300	0502	3485	2758	0005576	0262	14758
072		OBS	0305	0499	3486	2759			14758
		STD	0400	0459	3491	2767	0004758	0314	14758
072		OBS	0405	0457	3491	2767			14758
		STD	0500	0419	3491	2772	0004393	0360	14758
		STD	0600	0390	3491	2775	0004164	0403	14762
072		OBS	T0606	0389	3491	2775			14763
		STD	0700	0380	3491	2776	0004143	0444	14775
		STD	0800	0370	3491	2777	0004123	0486	14787
072		OBS	0804	0370	3491	2777			14788
		STD	0900	0364	3491	2777	0004138	0527	14801
		STD	1000	0358	3491	2778	0004152	0568	14815
072		OBS	T1001	0358	3491	2778			14815
		STD	1100	0354	3491	2778	0004186	0610	14830
		STD	1200	0351	3491	2779	0004231	0652	14846
		STD	1300	0349	3491	2779	0004287	0695	14862
		STD	1400	0348	3490	2778	0004428	0738	14878
072		OBS	T1499	0348	3490	2778			14895

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4432 N	04636 W		149	46	04	07	100	1963		8434	3750	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		32	F04		042			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0695	3418	2680	0012553	0000	14778
106		OBS	0000	0695	3418	2680			14778
		STD	0010	0697	3418	2680	0012564	0013	14780
		STD	0020	0698	3419	2680	0012563	0025	14782
106		OBS	0025	0699	3419	2680			14784
		STD	0030	0699	3419	2680	0012564	0038	14785
		STD	0050	0700	3420	2681	0012546	0063	14788
106		OBS	0050	0700	3420	2681			14788
106		OBS	0065	0710	3422	2681			14795
		STD	0075	0769	3434	2682	0012482	0094	14821
		STD	0100	0869	3460	2687	0012051	0125	14867
106		OBS	0101	0872	3461	2688			14868
		STD	0125	0870	3478	2701	0010776	0153	14873
		STD	0150	0867	3488	2710	0010044	0179	14878
106		OBS	0150	0867	3488	2710			14878
		STD	0200	0790	3482	2717	0009428	0228	14856
106		OBS	0201	0788	3482	2717			14855
		STD	0250	0644	3482	2737	0007497	0270	14807
		STD	0300	0550	3482	2749	0006374	0305	14778
106		OBS	0302	0547	3482	2750			14777
		STD	0400	0525	3495	2762	0005250	0363	14786
106		OBS	0402	0524	3495	2763			14786
		STD	0500	0494	3496	2767	0004897	0414	14790
		STD	0600	0463	3497	2772	0004563	0461	14793
106		OBS	T0603	0462	3497	2772			14794
		STD	0700	0428	3495	2774	0004393	0506	14795
		STD	0800	0403	3493	2775	0004345	0550	14801
106		OBS	0804	0402	3493	2775			14801
		STD	0900	0392	3493	2776	0004310	0593	14813
		STD	1000	0381	3493	2777	0004270	0636	14825
106		OBS	T1005	0380	3493	2777			14826
		STD	1100	0372	3493	2778	0004254	0678	14838
		STD	1200	0365	3493	2779	0004254	0721	14852
		STD	1300	0360	3493	2779	0004276	0764	14867
		STD	1400	0357	3493	2780	0004320	0807	14882
		STD	1500	0355	3493	2780	0004376	0850	14898
106		OBS	T1506	0355	3493	2780			14899

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4425 N	04558 W		149	45	04	07	131	1963		8435	3800	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		32	F03		047			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0694	3415	2678	0012764	0000	14777
146		OBS	0000	0694	3415	2678			14777
		STD	0010	0693	3415	2678	0012768	0013	14778
		STD	0020	0692	3415	2678	0012773	0026	14780
146		OBS	0025	0692	3415	2678			14780
		STD	0030	0692	3415	2678	0012781	0038	14781
		STD	0050	0691	3415	2678	0012800	0064	14784
146		OBS	0050	0691	3415	2678			14784
146		OBS	0074	0880	3462	2687			14867
		STD	0075	0880	3462	2687	0012010	0095	14867
146		OBS	0099	0884	3468	2691			14873
		STD	0100	0885	3469	2692	0011626	0124	14874
		STD	0125	0907	3484	2700	0010911	0153	14888
146		OBS	0148	0928	3492	2703			14901
		STD	0150	0921	3492	2704	0010585	0179	14898
146		OBS	T0198	0785	3488	2722			14854
		STD	0200	0782	3488	2723	0008860	0228	14854
		STD	0250	0708	3494	2738	0007506	0269	14834
146		OBS	0292	0655	3498	2749			14820
		STD	0300	0647	3498	2750	0006409	0304	14819
146		OBS	0382	0572	3500	2761			14802
		STD	0400	0555	3500	2763	0005227	0362	14798
		STD	0500	0480	3498	2770	0004580	0411	14784
146		OBS	T0554	0454	3497	2773			14782
		STD	0600	0451	3497	2773	0004452	0456	14788
		STD	0700	0443	3495	2773	0004546	0501	14801
146		OBS	0735	0440	3495	2772			14806
		STD	0800	0408	3494	2775	0004345	0546	14803
		STD	0900	0369	3492	2778	0004105	0588	14803
146		OBS	T0914	0364	3492	2778			14804
		STD	1000	0360	3492	2778	0004114	0629	14816
		STD	1100	0355	3492	2779	0004155	0670	14831
		STD	1200	0350	3491	2779	0004193	0712	14845
		STD	1300	0346	3491	2779	0004231	0754	14860
146		OBS	T1395	0341	3491	2780			14874

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4418 N	04515 W		149	45	04	07	160	1963		8436	4230	13

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		34	F03		056			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0855	3454	2685	0012098	0000	14844
166		OBS	0000	0855	3454	2685			14844
		STD	0010	0872	3458	2685	0012073	0012	14853
		STD	0020	0895	3463	2686	0012068	0024	14864
166		OBS	0023	0904	3465	2686			14868
		STD	0030	0935	3472	2686	0012039	0036	14881
166		OBS	0047	0996	3486	2687			14908
		STD	0050	1004	3488	2687	0012003	0060	14912
166		OBS	0070	1045	3499	2689			14932
		STD	0075	1057	3502	2689	0011910	0090	14937
166		OBS	0093	1070	3505	2689			14945
		STD	0100	1035	3496	2688	0012038	0120	14932
		STD	0125	0938	3475	2688	0012059	0150	14898
166		OBS	0139	0901	3470	2690			14886
		STD	0150	0896	3475	2695	0011451	0180	14887
166		OBS	T0186	0869	3488	2709			14884
		STD	0200	0850	3490	2714	0009734	0233	14880
		STD	0250	0773	3495	2730	0008315	0278	14859
166		OBS	0276	0729	3496	2737			14847
		STD	0300	0673	3494	2743	0007069	0316	14828
166		OBS	0363	0560	3490	2755			14793
		STD	0400	0549	3494	2759	0005598	0379	14795
		STD	0500	0512	3501	2769	0004745	0431	14798
166		OBS	T0532	0499	3502	2771			14798
		STD	0600	0458	3499	2774	0004363	0477	14792
		STD	0700	0413	3494	2775	0004284	0520	14789
166		OBS	0705	0411	3494	2775			14789
		STD	0800	0389	3493	2777	0004159	0562	14795
166		OBS	T0874	0375	3493	2778			14802
		STD	0900	0374	3493	2778	0004105	0603	14806
		STD	1000	0371	3493	2778	0004151	0645	14821
		STD	1100	0367	3493	2779	0004196	0687	14836
		STD	1200	0364	3493	2779	0004238	0729	14851
		STD	1300	0360	3493	2779	0004278	0771	14867
166		OBS	T1335	0359	3493	2779			14872

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4449 N	04515 W		149	45	04	07	202	1963		8437	3930	16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		34	F05		024			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0566	3426	2703	0010363	0000	14727
211		OBS	0000	0566	3426	2703			14727
		STD	0010	0568	3426	2703	0010378	0010	14730
		STD	0020	0570	3427	2703	0010384	0021	14732
211		OBS	0029	0572	3427	2703			14735
		STD	0030	0570	3427	2704	0010373	0031	14734
		STD	0050	0533	3422	2704	0010344	0052	14722
211		OBS	0058	0521	3421	2705			14718
		STD	0075	0501	3420	2707	0010128	0077	14712
211		OBS	0087	0486	3420	2708			14708
		STD	0100	0555	3439	2715	0009388	0102	14741
211		OBS	0117	0621	3459	2722			14773
		STD	0125	0625	3464	2726	0008404	0124	14776
		STD	0150	0636	3475	2733	0007760	0144	14786
211		OBS	0174	0646	3481	2736			14795
		STD	0200	0579	3476	2741	0007046	0181	14772
211		OBS	T0232	0520	3474	2747			14753
		STD	0250	0520	3478	2750	0006249	0215	14757
		STD	0300	0517	3487	2757	0005604	0244	14765
211		OBS	0341	0511	3492	2762			14770
		STD	0400	0496	3496	2767	0004804	0296	14774
211		OBS	0443	0486	3498	2770			14777
		STD	0500	0476	3499	2772	0004466	0343	14783
		STD	0600	0457	3501	2775	0004232	0386	14791
211		OBS	T0634	0450	3501	2776			14794
		STD	0700	0433	3500	2777	0004089	0428	14798
		STD	0800	0409	3498	2778	0004053	0468	14804
211		OBS	0840	0401	3497	2778			14807
		STD	0900	0390	3496	2779	0004063	0509	14813
		STD	1000	0374	3495	2779	0004073	0550	14822
211		OBS	T1042	0368	3494	2779			14827
		STD	1100	0366	3494	2780	0004105	0590	14836
		STD	1200	0364	3494	2780	0004143	0632	14852
		STD	1300	0361	3495	2780	0004178	0673	14867
		STD	1400	0358	3495	2781	0004212	0715	14883
		STD	1500	0356	3495	2781	0004244	0758	14899
211		OBS	T1558	0354	3495	2781			14908

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4520 N	04515 W		149	55	04	08	008	1963		8438	3930	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		32	F04		019			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0884	3486	2705	0010157	0000	14859
015	OBS	0000	0884	3486	2705			14859
	STD	0010	0888	3486	2705	0010207	0010	14862
	STD	0020	0891	3487	2705	0010243	0020	14865
015	OBS	0024	0892	3487	2705			14866
	STD	0030	0892	3487	2705	0010267	0031	14867
015	OBS	0049	0893	3487	2705			14871
	STD	0050	0893	3487	2705	0010316	0051	14871
015	OBS	0073	0899	3489	2705			14877
	STD	0075	0903	3490	2705	0010300	0077	14879
015	OBS	0098	0937	3498	2706			14897
	STD	0100	0937	3498	2706	0010287	0103	14897
	STD	0125	0933	3499	2707	0010236	0128	14900
015	OBS	0145	0930	3499	2708			14902
	STD	0150	0887	3493	2710	0009981	0154	14886
015	OBS	T0194	0595	3457	2724			14775
	STD	0200	0590	3458	2725	0008523	0200	14774
	STD	0250	0553	3465	2736	0007613	0240	14768
015	OBS	0292	0533	3472	2744			14768
	STD	0300	0533	3474	2745	0006764	0276	14770
015	OBS	0388	0527	3490	2759			14784
	STD	0400	0522	3491	2760	0005489	0337	14784
	STD	0500	0486	3497	2769	0004727	0389	14786
015	OBS	T0582	0461	3500	2774			14790
	STD	0600	0456	3500	2775	0004257	0433	14791
	STD	0700	0430	3497	2775	0004276	0476	14796
015	OBS	0775	0415	3496	2776			14802
	STD	0800	0412	3496	2776	0004244	0519	14805
	STD	0900	0403	3495	2777	0004269	0561	14818
015	OBS	T0966	0397	3495	2777			14827
	STD	1000	0394	3495	2777	0004283	0604	14831
	STD	1100	0387	3495	2778	0004289	0647	14845
	STD	1200	0380	3495	2779	0004291	0690	14859
	STD	1300	0375	3495	2779	0004316	0733	14873
	STD	1400	0370	3495	2780	0004338	0776	14888
015	OBS	T1458	0368	3495	2780			14897

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4520 N	04557 W		149	55	04	08	050	1963		8439	3430	13

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F05		015			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0761	3462	2705	0010160	0000	14809
058	OBS	0000	0761	3462	2705			14809
	STD	0010	0762	3463	2706	0010147	0010	14811
	STD	0020	0762	3463	2706	0010140	0020	14813
058	OBS	0022	0762	3463	2706			14813
	STD	0030	0762	3463	2706	0010157	0030	14815
058	OBS	0043	0763	3463	2706			14817
	STD	0050	0762	3461	2704	0010334	0051	14818
058	OBS	0065	0709	3454	2706			14799
	STD	0075	0589	3441	2712	0009612	0076	14751
058	OBS	0086	0516	3435	2716			14722
	STD	0100	0655	3464	2722	0008756	0099	14784
	STD	0125	0809	3500	2728	0008243	0120	14853
058	OBS	0129	0822	3503	2728			14859
	STD	0150	0796	3504	2733	0007840	0140	14853
058	OBS	T0172	0768	3504	2737			14846
	STD	0200	0728	3504	2743	0006922	0177	14835
	STD	0250	0654	3503	2753	0006069	0210	14814
058	OBS	0260	0639	3502	2754			14809
	STD	0300	0565	3498	2760	0005368	0238	14786
058	OBS	0348	0498	3494	2765			14766
	STD	0400	0492	3495	2767	0004801	0289	14772
	STD	0500	0471	3498	2772	0004458	0335	14780
058	OBS	T0528	0463	3499	2773			14782
	STD	0600	0433	3497	2774	0004248	0379	14781
	STD	0700	0392	3493	2776	0004121	0421	14780
058	OBS	0702	0391	3493	2776			14780
	STD	0800	0385	3494	2777	0004098	0462	14794
058	OBS	T0875	0380	3494	2778			14804
	STD	0900	0378	3494	2778	0004077	0503	14807
	STD	1000	0372	3494	2779	0004094	0544	14822
	STD	1100	0366	3494	2779	0004108	0585	14836
	STD	1200	0359	3493	2779	0004181	0626	14849
	STD	1300	0353	3492	2779	0004263	0668	14864
058	OBS	T1346	0350	3492	2780			14870

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4520 N	04638 W		149	56	04	08	095	1963		8440	3120	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		32	F05		019			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0418	3419	2715	0009288	0000	14665
100	OBS	0000	0418	3419	2715			14665
	STD	0010	0418	3419	2715	0009264	0009	14667
	STD	0020	0417	3420	2715	0009239	0019	14668
100	OBS	0026	0417	3420	2715			14669
	STD	0030	0417	3420	2715	0009228	0028	14670
	STD	0050	0415	3420	2716	0009231	0046	14672
100	OBS	0052	0415	3420	2716			14673
	STD	0075	0341	3426	2728	0008085	0068	14646
100	OBS	0079	0338	3428	2730			14646
	STD	0100	0377	3444	2739	0007094	0087	14668
100	OBS	0105	0386	3447	2740			14673
	STD	0125	0442	3461	2745	0006505	0104	14702
	STD	0150	0484	3475	2752	0005941	0119	14725
100	OBS	0156	0490	3477	2753			14729
	STD	0200	0470	3486	2762	0005019	0147	14729
100	OBS	T0209	0466	3487	2763			14729
	STD	0250	0453	3490	2767	0004586	0171	14731
	STD	0300	0443	3493	2771	0004305	0193	14735
100	OBS	0313	0441	3494	2772			14736
	STD	0400	0444	3497	2774	0004090	0235	14752
100	OBS	0416	0444	3498	2774			14755
	STD	0500	0407	3495	2776	0003946	0275	14753
	STD	0600	0377	3492	2777	0003960	0315	14757
100	OBS	T0622	0372	3491	2777			14758
	STD	0700	0367	3491	2777	0004027	0355	14769
	STD	0800	0363	3490	2777	0004106	0395	14784
100	OBS	0828	0362	3490	2777			14788
	STD	0900	0363	3491	2777	0004151	0437	14801
	STD	1000	0365	3492	2778	0004186	0478	14818
100	OBS	T1032	0366	3492	2778			14824
	STD	1100	0366	3493	2779	0004182	0520	14836
	STD	1200	0365	3493	2779	0004254	0562	14852
	STD	1300	0363	3494	2780	0004240	0605	14868
	STD	1400	0359	3494	2780	0004272	0647	14883
	STD	1500	0355	3494	2781	0004302	0690	14898
100	OBS	T1545	0352	3494	2781			14905

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	45195N	04722 W		149	57	04	08	137	1963		8441	2750	14

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		34	F04		022			

MESSENGER TIME HR 1/10	CAST or NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0444	3428	2719	0008875	0000	14677
142		OBS	0000	0444	3428	2719			14677
		STD	0010	0444	3428	2719	0008881	0009	14679
		STD	0020	0443	3428	2719	0008886	0018	14680
142		OBS	0022	0443	3428	2719			14681
		STD	0030	0443	3428	2719	0008895	0027	14682
142		OBS	0046	0443	3428	2719			14685
		STD	0050	0439	3428	2719	0008873	0044	14683
142		OBS	0068	0420	3428	2721			14678
		STD	0075	0411	3430	2724	0008461	0066	14676
142		OBS	0091	0398	3435	2729			14674
		STD	0100	0403	3439	2732	0007727	0086	14678
		STD	0125	0417	3452	2741	0006917	0105	14690
142		OBS	0136	0423	3458	2745			14695
		STD	0150	0457	3469	2750	0006093	0121	14713
142		OBS	T0182	0510	3489	2760			14743
		STD	0200	0506	3490	2761	0005094	0149	14744
		STD	0250	0493	3494	2766	0004710	0173	14748
142		OBS	0270	0488	3496	2768			14749
		STD	0300	0451	3493	2770	0004395	0196	14738
142		OBS	0354	0400	3489	2772			14725
		STD	0400	0393	3489	2773	0004136	0239	14730
		STD	0500	0381	3490	2775	0004055	0280	14742
142		OBS	T0517	0379	3490	2775			14744
		STD	0600	0375	3490	2776	0004047	0320	14756
		STD	0700	0371	3491	2777	0004043	0361	14771
142		OBS	0702	0371	3491	2777			14771
		STD	0800	0365	3492	2778	0004025	0401	14785
142		OBS	T0892	0360	3492	2779			14798
		STD	0900	0360	3492	2779	0004016	0441	14800
		STD	1000	0355	3492	2779	0004042	0482	14814
		STD	1100	0352	3492	2779	0004088	0522	14830
		STD	1200	0350	3492	2780	0004146	0563	14845
		STD	1300	0348	3492	2780	0004202	0605	14861
142		OBS	T1395	0348	3492	2780			14877

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4536 N	04750 W		149	57	04	08	167	1963		8442	1550	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS
		32	F03		007			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0091	3383	2713	0009408	0000	14518
172	OBS	0000	0091	3383	2713			14518
	STD	0010	0113	3388	2716	0009162	0009	14530
	STD	0020	0145	3394	2719	0008914	0018	14547
172	OBS	0024	0160	3397	2720			14555
	STD	0030	0197	3402	2721	0008674	0027	14573
172	OBS	0048	0286	3417	2726			14617
	STD	0050	0300	3420	2727	0008151	0044	14623
172	OBS	0072	0358	3442	2739			14655
	STD	0075	0335	3442	2741	0006809	0063	14646
172	OBS	0096	0227	3444	2752			14603
	STD	0100	0236	3445	2752	0005756	0078	14607
	STD	0125	0285	3454	2755	0005506	0092	14634
172	OBS	0144	0316	3460	2757			14651
	STD	0150	0324	3462	2758	0005275	0106	14656
172	OBS	T0192	0367	3474	2763			14683
	STD	0200	0368	3475	2764	0004764	0131	14685
	STD	0250	0371	3481	2769	0004389	0154	14695
172	OBS	0289	0374	3485	2772			14703
	STD	0300	0375	3486	2772	0004101	0175	14706
172	OBS	0386	0383	3489	2774			14724
	STD	0400	0382	3489	2774	0004033	0216	14725
	STD	0500	0377	3490	2775	0004034	0256	14740
172	OBS	T0582	0373	3490	2776			14752
	STD	0600	0372	3490	2776	0004039	0296	14754
	STD	0700	0366	3490	2776	0004061	0337	14769
172	OBS	0775	0362	3490	2777			14779
	STD	0800	0361	3490	2777	0004091	0378	14783
	STD	0900	0356	3490	2777	0004118	0419	14798
172	OBS	T0969	0354	3490	2778			14808
	STD	1000	0353	3490	2778	0004159	0460	14813
	STD	1100	0350	3490	2778	0004190	0502	14829
	STD	1200	0349	3491	2778	0004244	0544	14845
	STD	1300	0348	3491	2779	0004297	0587	14861
	STD	1400	0348	3491	2779	0004362	0630	14878
172	OBS	T1470	0348	3491	2779			14890

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4543 N	04801 W		149	58	04	08	227	1963		8443	0610	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F00		-008			

MESSENGER TIME HR 1/10	≥ or ≤ CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0105	3304	2659	0014567	0000	14417
233		OBS	0000	-0105	3304	2659			14417
		STD	0010	-0123	3305	2660	0014431	0014	14410
		STD	0020	-0142	3309	2664	0014068	0029	14404
233		OBS	0024	-0149	3311	2666			14401
		STD	0030	-0133	3315	2669	0013624	0043	14410
233		OBS	0048	-0091	3330	2679			14435
		STD	0050	-0087	3332	2681	0012452	0069	14437
233		OBS	0073	-0044	3357	2699			14465
		STD	0075	-0028	3360	2701	0010537	0097	14473
233		OBS	0097	0112	3391	2718			14545
		STD	0100	0118	3393	2720	0008827	0122	14548
		STD	0125	0161	3410	2730	0007839	0142	14574
233		OBS	0146	0193	3423	2738			14593
		STD	0150	0199	3425	2739	0006996	0161	14597
233		OBS	T0194	0249	3446	2752			14629
		STD	0200	0251	3447	2753	0005784	0193	14631
		STD	0250	0269	3452	2755	0005594	0221	14647
233		OBS	0291	0283	3457	2758			14661
		STD	0300	0287	3458	2758	0005339	0249	14664
233		OBS	0387	0316	3468	2764			14692
		STD	0400	0319	3469	2764	0004890	0300	14696
		STD	0500	0336	3474	2767	0004765	0348	14720
233		OBS	T0580	0337	3474	2766			14734

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4520 N	04722 W		149	57	04	15	198	1963		8444	2790	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		25	F04		031			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0432	3427	2719	0008828	0000	14672
205	OBS	0000	0432	3427	2719			14672
	STD	0010	0432	3427	2720	0008807	0009	14674
	STD	0020	0431	3428	2720	0008769	0018	14675
205	OBS	0023	0430	3428	2720			14675
	STD	0030	0427	3427	2720	0008806	0026	14675
205	OBS	0047	0420	3426	2720			14675
	STD	0050	0419	3426	2720	0008819	0044	14675
205	OBS	0070	0412	3426	2721			14675
	STD	0075	0375	3424	2723	0008557	0066	14660
205	OBS	0094	0286	3420	2728			14625
	STD	0100	0306	3423	2729	0008011	0086	14635
	STD	0125	0375	3436	2732	0007697	0106	14670
205	OBS	0141	0407	3444	2736			14687
	STD	0150	0416	3450	2739	0007082	0125	14693
205	OBS	T0188	0444	3470	2752			14714
	STD	0200	0443	3473	2755	0005696	0156	14716
	STD	0250	0439	3484	2764	0004885	0183	14724
205	OBS	0283	0437	3488	2767			14729
	STD	0300	0428	3488	2768	0004514	0206	14728
205	OBS	0378	0398	3488	2771			14728
	STD	0400	0399	3489	2772	0004224	0250	14733
	STD	0500	0404	3493	2775	0004080	0292	14752
205	OBS	T0572	0408	3494	2775			14766
	STD	0600	0402	3493	2775	0004150	0333	14768
	STD	0700	0386	3491	2775	0004211	0375	14777
205	OBS	0766	0379	3490	2775			14785
	STD	0800	0378	3490	2775	0004284	0417	14790
	STD	0900	0376	3490	2775	0004349	0460	14806
205	OBS	T0963	0374	3490	2776			14816
	STD	1000	0373	3490	2776	0004394	0504	14821
	STD	1100	0370	3491	2776	0004414	0548	14837
	STD	1200	0366	3491	2777	0004421	0592	14852
	STD	1300	0362	3491	2778	0004426	0636	14867
	STD	1400	0357	3492	2779	0004416	0681	14882
205	OBS	T1471	0354	3492	2779			14893

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4534 N	04750 W		149	57	04	15	237	1963		8445	1470	13

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F05		010			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	−0013	3322	2670	0013528	0000	14462
243		OBS	0000	−0013	3322	2670			14462
		STD	0010	0047	3351	2690	0011600	0013	14495
		STD	0020	0095	3375	2707	0010042	0023	14522
243		OBS	0025	0114	3384	2713			14533
		STD	0030	0125	3389	2716	0009165	0033	14539
		STD	0050	0161	3407	2728	0008044	0050	14561
243		OBS	0051	0163	3408	2728			14562
		STD	0075	0193	3428	2742	0006694	0069	14582
243		OBS	0076	0194	3429	2743			14583
		STD	0100	0209	3441	2751	0005843	0084	14595
243		OBS	0102	0211	3442	2752			14596
		STD	0125	0246	3451	2757	0005368	0098	14617
		STD	0150	0284	3462	2762	0004941	0111	14639
243		OBS	0151	0285	3462	2762			14639
		STD	0200	0360	3477	2767	0004535	0135	14682
243		OBS	T0206	0366	3478	2767			14685
		STD	0250	0371	3482	2769	0004339	0157	14695
		STD	0300	0376	3486	2772	0004129	0178	14706
243		OBS	0304	0376	3486	2772			14707
		STD	0400	0377	3490	2775	0003935	0219	14723
243		OBS	0407	0377	3490	2775			14725
		STD	0500	0372	3489	2775	0004017	0258	14738
		STD	0600	0367	3488	2775	0004126	0299	14752
243		OBS	T0614	0366	3488	2775			14754
		STD	0700	0362	3488	2775	0004135	0340	14767
		STD	0800	0358	3489	2776	0004138	0382	14782
243		OBS	0816	0357	3489	2776			14784
		STD	0900	0355	3489	2776	0004204	0423	14797
		STD	1000	0352	3488	2776	0004289	0466	14812
243		OBS	T1016	0351	3488	2776			14815
		STD	1100	0349	3489	2777	0004304	0509	14828
		STD	1200	0348	3489	2777	0004328	0552	14844
		STD	1300	0347	3490	2778	0004344	0595	14861
243		OBS	T1320	0347	3490	2778			14864

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4543 N	04800 W		149	58	04	16	025	1963		8446	0650	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		22	F03		003			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0089	3292	2649	0015538	0000	14423
031		OBS	0000	-0089	3292	2649			14423
		STD	0010	-0090	3292	2649	0015528	0016	14424
		STD	0020	-0092	3292	2649	0015518	0031	14425
031		OBS	0023	-0092	3292	2649			14425
		STD	0030	-0091	3306	2660	0014443	0046	14429
031		OBS	0046	-0087	3334	2683			14437
		STD	0050	-0077	3341	2688	0011800	0072	14444
031		OBS	0069	-0035	3366	2706			14470
		STD	0075	-0027	3370	2709	0009779	0099	14475
031		OBS	0092	0009	3382	2717			14496
		STD	0100	0053	3392	2723	0008506	0122	14519
		STD	0125	0165	3417	2736	0007338	0142	14576
031		OBS	0138	0207	3428	2741			14599
		STD	0150	0225	3435	2745	0006447	0159	14609
031		OBS	T0184	0267	3451	2755			14635
		STD	0200	0278	3454	2756	0005493	0189	14643
		STD	0250	0305	3463	2761	0005096	0215	14664
031		OBS	0276	0316	3466	2762			14674
		STD	0300	0320	3468	2763	0004900	0240	14680
031		OBS	0368	0332	3473	2766			14697
		STD	0400	0338	3475	2767	0004631	0288	14705
		STD	0500	0359	3481	2770	0004483	0334	14731
031		OBS	T0552	0371	3484	2771			14745

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4547 N	04810 W		149	58	04	16	042	1963		8447	0185	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F04		001			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/₀₀	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0101	3288	2646	0015807	0000	14417
045		OBS	0000	-0101	3288	2646			14417
		STD	0010	-0102	3288	2646	0015768	0016	14418
		STD	0020	-0103	3289	2647	0015728	0032	14419
045		OBS	0025	-0103	3289	2647			14420
		STD	0030	-0113	3290	2647	0015630	0047	14416
		STD	0050	-0138	3292	2650	0015362	0078	14408
045		OBS	0050	-0138	3292	2650			14408
		STD	0075	-0130	3304	2660	0014446	0115	14418
045		OBS	0075	-0130	3304	2660			14418
		STD	0100	-0093	3328	2678	0012712	0149	14442
045		OBS	0100	-0093	3328	2678			14442
		STD	0125	-0025	3352	2695	0011147	0179	14482
		STD	0150	0074	3375	2708	0009921	0206	14534
045		OBS	0151	0079	3376	2708			14537

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4553 N	04820 W		149	58	04	16	051	1963		8448	0114	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		22	F03		007			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/₀₀	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0078	3300	2655	0014961	0000	14429
054		OBS	0000	-0078	3300	2655			14429
		STD	0010	-0077	3300	2654	0014989	0015	14431
		STD	0020	-0076	3299	2654	0015017	0030	14433
054		OBS	0024	-0076	3299	2654			14434
		STD	0030	-0076	3299	2654	0015043	0045	14435
054		OBS	0049	-0077	3298	2653			14437
		STD	0050	-0080	3298	2653	0015073	0075	14436
054		OBS	0074	-0125	3300	2656			14419
		STD	0075	-0125	3301	2657	0014692	0112	14420
054		OBS	T0098	-0115	3324	2675			14431

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4558 N	04830 W		149	58	04	16	067	1963		8449	0095	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		22	F04		011			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0033	3297	2647	0015649	0000	14480
069	OBS	0000	0033	3297	2647			14480
	STD	0010	0028	3298	2649	0015546	0016	14479
	STD	0020	0023	3301	2651	0015291	0031	14479
069	OBS	0026	0020	3303	2653			14479
	STD	0030	0005	3304	2655	0014974	0046	14473
	STD	0050	-0051	3315	2666	0013888	0075	14452
069	OBS	0052	-0055	3316	2667			14451
	STD	0075	-0069	3334	2682	0012355	0108	14450
069	OBS	T0077	-0070	3336	2684			14451

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4608 N	04843 W		149	68	04	16	083	1963		8450	0085	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		25	F04		012			

MESSENGER TIME HR. 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0079	3262	2617	0018555	0000	14496
088	OBS	0000	0079	3262	2617			14496
	STD	0010	0079	3264	2618	0018431	0018	14498
	STD	0020	0072	3265	2620	0018270	0037	14496
088	OBS	0025	0067	3266	2621			14495
	STD	0030	0058	3272	2626	0017676	0055	14493
	STD	0050	0019	3292	2644	0015951	0088	14481
088	OBS	0050	0019	3292	2644			14481
	STD	0075	-0031	3306	2658	0014647	0127	14464
088	OBS	0075	-0031	3306	2658			14464

731-298 O—64——10

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46165N	04858 W		149	68	04	16	103	1963		8451	0070	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		25	F04		013			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0078	3257	2613	0018931	0000	14495
106		OBS	0000	0078	3257	2613			14495
		STD	0010	0078	3257	2613	0018896	0019	14496
		STD	0020	0077	3258	2614	0018870	0038	14498
106		OBS	0027	0077	3258	2614			14499
		STD	0030	0073	3259	2615	0018746	0057	14498
		STD	0050	0030	3275	2630	0017301	0093	14484
106		OBS	T0054	0017	3279	2634			14479

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4616 N	04834 W		149	68	04	16	124	1963		8452	0092	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		25	F03		013			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0046	3288	2640	0016400	0000	14485
127		OBS	0000	0046	3288	2640			14485
		STD	0010	0043	3288	2640	0016385	0016	14485
		STD	0020	0041	3288	2640	0016369	0033	14485
127		OBS	0026	0039	3288	2640			14486
		STD	0030	0021	3294	2646	0015813	0049	14479
		STD	0050	-0040	3315	2665	0013932	0079	14457
127		OBS	0052	-0044	3316	2666			14456
		STD	0075	-0051	3320	2669	0013533	0113	14457
127		OBS	T0078	-0052	3320	2670			14457

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46135N	04758 W		149	67	04	16	146	1963		8453	0118	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		004			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T, °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0072	3298	2653	0015134	0000	14432
149	OBS	0000	-0072	3298	2653			14432
	STD	0010	-0072	3299	2654	0015051	0015	14433
	STD	0020	-0073	3301	2655	0014892	0030	14435
149	OBS	0025	-0073	3302	2656			14436
	STD	0030	-0070	3303	2657	0014743	0045	14438
	STD	0050	-0059	3310	2662	0014239	0074	14448
149	OBS	0050	-0059	3310	2662			14448
149	OBS	0074	-0053	3320	2670			14456
	STD	0075	-0053	3321	2671	0013411	0108	14456
149	OBS	T0099	-0051	3344	2689			14464

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46125N	04742 W		149	67	04	16	160	1963		8454	0175	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		003			

MESSENGER TIME HR. 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0049	3298	2652	0015218	0000	14442
164	OBS	0000	-0049	3298	2652			14442
	STD	0010	-0049	3299	2653	0015152	0015	14444
	STD	0020	-0051	3300	2653	0015079	0030	14445
164	OBS	0025	-0052	3300	2654			14445
	STD	0030	-0056	3300	2654	0014994	0045	14444
	STD	0050	-0064	3302	2656	0014832	0075	14444
164	OBS	0050	-0064	3302	2656			14444
164	OBS	0074	-0055	3322	2672			14455
	STD	0075	-0057	3322	2672	0013303	0110	14454
164	OBS	0099	-0069	3326	2675			14453
	STD	0100	-0068	3327	2676	0012882	0143	14454
	STD	0125	0013	3357	2697	0010951	0173	14500
164	OBS	T0149	0176	3409	2728			14584

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46115N	04726 W		149	67	04	16	192	1963		8455	0605	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F02		000			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0084	3285	2643	0016090	0000	14424
196	OBS	0000	-0084	3285	2643			14424
	STD	0010	-0091	3287	2645	0015909	0016	14423
	STD	0020	-0098	3289	2647	0015729	0032	14422
196	OBS	0025	-0101	3290	2647			14421
	STD	0030	-0086	3306	2660	0014458	0047	14431
	STD	0050	-0027	3355	2697	0010931	0072	14469
196	OBS	0050	-0027	3355	2697			14469
	STD	0075	0040	3377	2711	0009577	0098	14507
196	OBS	0075	0040	3377	2711			14507
	STD	0100	0172	3404	2725	0008364	0120	14574
196	OBS	0100	0172	3404	2725			14574
	STD	0125	0189	3415	2732	0007681	0140	14587
	STD	0150	0206	3426	2739	0007005	0159	14600
196	OBS	0151	0207	3426	2740			14600
	STD	0200	0238	3442	2750	0006074	0191	14624
196	OBS	T0201	0239	3442	2750			14625
	STD	0250	0266	3451	2754	0005666	0221	14646
	STD	0300	0293	3460	2759	0005274	0248	14667
196	OBS	0302	0294	3460	2759			14668
	STD	0400	0343	3476	2767	0004630	0298	14707
196	OBS	0402	0344	3476	2767			14708
	STD	0500	0373	3486	2772	0004259	0342	14738
	STD	0600	0383	3490	2775	0004161	0384	14759
196	OBS	T0603	0383	3490	2775			14760

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4611 N	04708 W		149	67	04	16	214	1963		8456	1470	14

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		22	F02		002			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0007	3314	2663	0014165	0000	14464
220	OBS	0000	-0007	3314	2663			14464
	STD	0010	-0003	3325	2672	0013340	0014	14469
	STD	0020	0006	3338	2682	0012386	0027	14477
220	OBS	0025	0012	3346	2688			14481
	STD	0030	0019	3357	2696	0010997	0038	14487
220	OBS	0049	0055	3391	2722			14511
	STD	0050	0059	3392	2722	0008541	0058	14513
220	OBS	0074	0130	3414	2736			14552
	STD	0075	0131	3415	2736	0007239	0078	14553
220	OBS	0098	0169	3428	2744			14575
	STD	0100	0175	3430	2745	0006418	0095	14579
	STD	0125	0243	3450	2756	0005449	0109	14615
220	OBS	0148	0284	3462	2762			14638
	STD	0150	0285	3462	2762	0004905	0122	14639
220	OBS	T0197	0304	3468	2765			14656
	STD	0200	0306	3469	2765	0004618	0146	14657
	STD	0250	0336	3477	2769	0004341	0169	14680
220	OBS	0296	0355	3482	2771			14696
	STD	0300	0356	3482	2771	0004191	0190	14697
220	OBS	0395	0370	3486	2773			14719
	STD	0400	0371	3486	2773	0004141	0232	14720
	STD	0500	0378	3488	2773	0004194	0273	14740
220	OBS	T0594	0381	3489	2774			14757
	STD	0600	0381	3489	2774	0004213	0315	14758
	STD	0700	0376	3490	2775	0004210	0357	14773
220	OBS	0789	0372	3490	2776			14786
	STD	0800	0371	3490	2776	0004204	0400	14787
	STD	0900	0364	3490	2777	0004210	0442	14801
220	OBS	T0982	0360	3490	2777			14813
	STD	1000	0360	3490	2777	0004246	0484	14816
	STD	1100	0359	3490	2777	0004317	0527	14832
	STD	1200	0358	3490	2777	0004387	0570	14849
	STD	1300	0357	3490	2777	0004457	0614	14865
220	OBS	T1378	0356	3490	2777			14878

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4608 N	04632 W		149	66	04	17	004	1963		8457	1005	09

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS.
		25	F03		009			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0125	3380	2709	0009843	0000	14533
010		OBS	0000	0125	3380	2709			14533
		STD	0010	0125	3381	2709	0009779	0010	14535
		STD	0020	0126	3382	2710	0009723	0020	14537
010		OBS	0023	0126	3382	2710			14537
		STD	0030	0148	3388	2714	0009391	0029	14549
010		OBS	0045	0191	3400	2720			14572
		STD	0050	0201	3404	2722	0008560	0047	14578
010		OBS	0068	0247	3418	2730			14603
		STD	0075	0276	3425	2733	0007583	0067	14618
010		OBS	0090	0327	3438	2739			14644
		STD	0100	0346	3445	2742	0006721	0085	14655
		STD	0125	0384	3460	2751	0005983	0101	14677
010		OBS	0136	0395	3465	2753			14684
		STD	0150	0400	3470	2757	0005417	0115	14689
010		OBS	T0181	0408	3480	2764			14699
		STD	0200	0405	3482	2766	0004617	0140	14701
		STD	0250	0399	3486	2770	0004303	0163	14707
010		OBS	0270	0397	3487	2771			14710
		STD	0300	0397	3488	2772	0004181	0184	14715
010		OBS	0360	0397	3490	2773			14725
		STD	0400	0390	3490	2774	0004052	0225	14729
		STD	0500	0376	3490	2775	0003993	0265	14740
010		OBS	T0536	0372	3490	2776			14744
		STD	0600	0367	3490	2776	0003984	0305	14752
		STD	0700	0362	3490	2777	0004016	0345	14767
010		OBS	0724	0361	3490	2777			14770
		STD	0800	0359	3490	2777	0004068	0386	14782
		STD	0900	0358	3490	2777	0004141	0427	14798
010		OBS	T0916	0358	3490	2777			14801

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4607 N	04600 W		149	66	04	17	035	1963		8458	1380	12

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		25	F03		015			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0338	3420	2723	0008453	0000	14632
040		OBS	0000	0338	3420	2723			14632
		STD	0010	0339	3420	2723	0008465	0008	14633
		STD	0020	0339	3420	2723	0008477	0017	14635
040		OBS	0021	0339	3420	2723			14635
		STD	0030	0351	3421	2723	0008519	0025	14642
040		OBS	0041	0356	3422	2723			14646
		STD	0050	0344	3422	2724	0008395	0042	14643
040		OBS	0062	0333	3422	2725			14640
		STD	0075	0326	3422	2726	0008248	0063	14639
040		OBS	0082	0324	3422	2726			14639
		STD	0100	0331	3426	2729	0008007	0083	14646
040		OBS	0123	0339	3438	2738			14655
		STD	0125	0346	3440	2739	0007116	0102	14658
		STD	0150	0413	3466	2752	0005851	0119	14694
040		OBS	T0164	0438	3476	2758			14708
		STD	0200	0423	3480	2762	0004956	0146	14708
040		OBS	0248	0405	3484	2768			14709
		STD	0250	0404	3484	2768	0004498	0169	14709
		STD	0300	0389	3486	2771	0004216	0191	14712
040		OBS	0334	0381	3488	2773			14714
		STD	0400	0378	3489	2774	0004021	0232	14724
		STD	0500	0373	3490	2776	0003968	0272	14738
040		OBS	T0512	0372	3490	2776			14740
		STD	0600	0368	3490	2776	0003995	0312	14753
040		OBS	0688	0364	3490	2777			14766
		STD	0700	0363	3490	2777	0004027	0352	14767
		STD	0800	0359	3489	2776	0004142	0393	14782
040		OBS	T0867	0357	3488	2776			14792
		STD	0900	0356	3488	2776	0004251	0435	14797
		STD	1000	0354	3489	2776	0004274	0478	14813
		STD	1100	0352	3489	2777	0004295	0520	14829
		STD	1200	0351	3490	2778	0004320	0563	14846
040		OBS	T1240	0351	3490	2778			14852

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46045N	04523 W		149	65	04	17	068	1963		8459	2240	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		32	F03		022			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10[7]	Σ ΔD DYN. M. X 10[3]	SOUND VELOCITY
	STD	0000	0437	3434	2724	0008352	0000	14675
075	OBS	0000	0437	3434	2724			14675
	STD	0010	0436	3434	2725	0008354	0008	14677
	STD	0020	0435	3434	2725	0008356	0017	14678
075	OBS	0025	0435	3434	2725			14679
	STD	0030	0420	3431	2724	0008434	0025	14673
	STD	0050	0380	3428	2726	0008283	0042	14659
075	OBS	0050	0380	3428	2726			14659
	STD	0075	0375	3440	2736	0007353	0061	14662
075	OBS	0075	0375	3440	2736			14662
	STD	0100	0389	3449	2741	0006836	0079	14674
075	OBS	0100	0389	3449	2741			14674
	STD	0125	0407	3460	2748	0006215	0095	14687
075	OBS	0149	0421	3469	2754			14698
	STD	0150	0422	3469	2754	0005704	0110	14698
075	OBS	T0199	0440	3481	2761			14716
	STD	0200	0439	3481	2762	0005045	0137	14715
	STD	0250	0413	3484	2766	0004631	0161	14713
075	OBS	0299	0397	3486	2770			14715
	STD	0300	0397	3486	2770	0004330	0184	14715
075	OBS	0399	0393	3489	2773			14730
	STD	0400	0393	3489	2773	0004159	0226	14730
	STD	0500	0383	3490	2774	0004106	0268	14742
	STD	0600	0380	3490	2775	0004127	0309	14758
075	OBS	T0600	0380	3490	2775			14758
	STD	0700	0391	3493	2776	0004120	0350	14779
075	OBS	0798	0394	3494	2777			14797
	STD	0800	0394	3494	2777	0004173	0391	14798
	STD	0900	0386	3493	2777	0004245	0434	14811
075	OBS	T0997	0380	3492	2776			14824
	STD	1000	0380	3492	2776	0004337	0476	14825
	STD	1100	0374	3492	2777	0004352	0520	14839
	STD	1200	0368	3492	2778	0004364	0563	14853
	STD	1300	0364	3492	2778	0004399	0607	14868
	STD	1400	0360	3492	2779	0004431	0651	14883
	STD	1500	0356	3492	2779	0004461	0696	14898
075	OBS	T1508	0356	3492	2779			14900

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4602 N	04440 W		149	64	04	17	103	1963		8460	3590	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		32	F04		040			

MESSENGER TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0807	3464	2700	0010658	0000	14827
109		OBS	0000	0807	3464	2700			14827
		STD	0010	0807	3464	2700	0010676	0011	14829
		STD	0020	0807	3464	2700	0010694	0021	14831
109		OBS	0025	0807	3464	2700			14831
		STD	0030	0807	3464	2700	0010718	0032	14832
		STD	0050	0809	3464	2700	0010777	0054	14836
109		OBS	0050	0809	3464	2700			14836
		STD	0075	0811	3464	2700	0010850	0081	14841
109		OBS	0076	0811	3464	2700			14841
		STD	0100	0784	3464	2704	0010508	0107	14835
109		OBS	0102	0782	3464	2704			14834
		STD	0125	0752	3469	2712	0009751	0133	14827
		STD	0150	0721	3474	2720	0008984	0156	14820
109		OBS	0151	0720	3474	2721			14820
		STD	0200	0661	3482	2735	0007668	0198	14806
109		OBS	T0202	0659	3482	2735			14805
		STD	0250	0611	3488	2746	0006653	0233	14795
		STD	0300	0573	3494	2756	0005803	0265	14788
109		OBS	0304	0570	3494	2756			14788
		STD	0400	0534	3500	2765	0004996	0319	14790
109		OBS	0406	0532	3500	2766			14790
		STD	0500	0528	3503	2768	0004817	0368	14804
		STD	0600	0505	3506	2774	0004438	0414	14812
109		OBS	T0613	0501	3506	2774			14812
		STD	0700	0445	3500	2776	0004232	0457	14803
		STD	0800	0399	3495	2777	0004157	0499	14800
109		OBS	0816	0394	3494	2777			14800
		STD	0900	0384	3493	2777	0004206	0541	14810
		STD	1000	0375	3492	2777	0004262	0583	14823
109		OBS	T1019	0373	3492	2777			14825
		STD	1100	0371	3492	2777	0004312	0626	14837
		STD	1200	0368	3492	2778	0004361	0670	14853
		STD	1300	0365	3492	2778	0004409	0713	14869
		STD	1400	0362	3492	2778	0004455	0758	14884
		STD	1500	0359	3492	2779	0004500	0803	14900
109		OBS	T1535	0358	3492	2779			14905

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46195N	04444 W		149	64	04	17	139	1963		8461	1430	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		32	F05		062			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0634	3435	2702	0010508	0000	14756
145	OBS	0000	0634	3435	2702			14756
	STD	0010	0634	3435	2701	0010552	0011	14757
	STD	0020	0629	3434	2702	0010534	0021	14757
145	OBS	0024	0626	3434	2702			14756
	STD	0030	0623	3434	2702	0010489	0032	14756
145	OBS	0048	0593	3432	2705			14747
	STD	0050	0584	3432	2706	0010191	0052	14744
145	OBS	0072	0502	3430	2714			14713
	STD	0075	0492	3429	2714	0009390	0077	14710
145	OBS	0097	0448	3428	2718			14695
	STD	0100	0459	3431	2720	0008909	0100	14700
	STD	0125	0526	3450	2727	0008259	0121	14735
145	OBS	0144	0549	3460	2732			14749
	STD	0150	0541	3461	2734	0007642	0141	14746
145	OBS	T0193	0493	3470	2747			14735
	STD	0200	0486	3473	2750	0006171	0175	14734
	STD	0250	0449	3490	2768	0004542	0202	14729
145	OBS	0290	0436	3498	2775			14731
	STD	0300	0442	3498	2775	0003921	0223	14735
145	OBS	0387	0468	3496	2770			14760
	STD	0400	0459	3495	2770	0004445	0265	14758
	STD	0500	0405	3491	2773	0004236	0309	14752
145	OBS	T0583	0375	3489	2775			14753
	STD	0600	0373	3489	2775	0004132	0351	14755
	STD	0700	0366	3488	2775	0004180	0392	14768
145	OBS	0780	0361	3488	2775			14779
	STD	0800	0360	3488	2775	0004228	0434	14782
	STD	0900	0357	3488	2776	0004278	0477	14798
145	OBS	T0977	0355	3488	2776			14810
	STD	1000	0355	3488	2776	0004336	0520	14814
	STD	1100	0354	3488	2776	0004412	0563	14830
	STD	1200	0354	3488	2776	0004487	0608	14847
	STD	1300	0353	3488	2776	0004562	0653	14863
145	OBS	T1368	0353	3488	2776			14874

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	46235N	04445 W		149	64	04	17	154	1963		8462	0600	05

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		32	F04		058			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M X 10³	SOUND VELOCITY
		STD	0000	0491	3424	2711	0009671	0000	14696
158		OBS	0000	0491	3424	2711			14696
		STD	0010	0486	3425	2712	0009545	0010	14696
158		OBS	0018	0481	3426	2713			14695
		STD	0020	0480	3426	2713	0009439	0019	14695
		STD	0030	0473	3425	2713	0009465	0029	14694
158		OBS	0035	0470	3424	2713			14693
		STD	0050	0461	3424	2714	0009404	0047	14692
158		OBS	0053	0458	3424	2714			14691
158		OBS	0070	0430	3424	2717			14682
		STD	0075	0472	3431	2718	0009022	0070	14702
		STD	0100	0582	3454	2723	0008590	0092	14754
158		OBS	0106	0583	3456	2725			14756
		STD	0125	0465	3446	2731	0007875	0113	14709
158		OBS	T0141	0400	3442	2735			14684
		STD	0150	0424	3449	2738	0007240	0132	14696
		STD	0200	0511	3476	2749	0006233	0166	14744
158		OBS	0216	0522	3482	2753			14752
		STD	0250	0494	3484	2758	0005498	0195	14747
158		OBS	0295	0462	3486	2763			14741
		STD	0300	0459	3486	2763	0004999	0221	14741
		STD	0400	0409	3487	2770	0004459	0263	14737
158		OBS	T0462	0392	3488	2772			14740

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4635 N	04448 W		149	64	04	17	169	1963		8463	0220	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		32	F04		057			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0390	3420	2718	0008939	0000	14654
171		OBS	0000	0390	3420	2718			14654
		STD	0010	0388	3420	2718	0008928	0009	14654
		STD	0020	0385	3420	2719	0008908	0018	14655
171		OBS	0025	0384	3420	2719			14655
		STD	0030	0382	3420	2719	0008887	0027	14655
		STD	0050	0375	3420	2720	0008837	0044	14655
171		OBS	0050	0375	3420	2720			14655
		STD	0075	0365	3420	2721	0008762	0066	14655
171		OBS	0075	0365	3420	2721			14655
		STD	0100	0351	3434	2733	0007595	0087	14655
171		OBS	0100	0351	3434	2733			14655
		STD	0125	0354	3440	2738	0007199	0105	14662
		STD	0150	0357	3446	2742	0006805	0123	14668
171		OBS	0151	0357	3446	2742			14668
		STD	0200	0386	3471	2759	0005246	0153	14692
171		OBS	T0201	0387	3472	2760			14692

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4640 N	04450 W		149	64	04	17	178	1963		8464	0175	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS.
		32	F04		059			

MESSENGER or TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0406	3424	2720	0008793	0000	14661
180		OBS	0000	0406	3424	2720			14661
		STD	0010	0402	3423	2720	0008823	0009	14661
		STD	0020	0395	3422	2720	0008824	0018	14659
180		OBS	0025	0391	3422	2720			14658
		STD	0030	0383	3423	2721	0008671	0026	14656
		STD	0050	0361	3430	2729	0007951	0043	14651
180		OBS	0050	0361	3430	2729			14651
180		OBS	0074	0356	3446	2742			14655
		STD	0075	0356	3446	2742	0006705	0061	14655
180		OBS	0099	0352	3450	2746			14658
		STD	0100	0352	3450	2746	0006394	0078	14658
		STD	0125	0343	3452	2748	0006178	0093	14659
180		OBS	T0149	0329	3454	2751			14657

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04451 W		149	64	04	17	191	1963		8465	0165	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		32	F04		040			

MESSENGER or TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0392	3422	2720	0008807	0000	14655
194		OBS	0000	0392	3422	2720			14655
		STD	0010	0388	3422	2720	0008777	0009	14655
		STD	0020	0384	3422	2720	0008747	0018	14655
194		OBS	0025	0381	3422	2721			14654
		STD	0030	0377	3422	2721	0008689	0026	14653
		STD	0050	0366	3422	2722	0008600	0044	14652
194		OBS	0050	0366	3422	2722			14652
194		OBS	0074	0362	3444	2740			14657
		STD	0075	0362	3444	2740	0006905	0063	14657
194		OBS	0099	0363	3452	2746			14663
		STD	0100	0363	3452	2747	0006336	0079	14663
		STD	0125	0369	3459	2751	0005922	0095	14670
194		OBS	T0149	0374	3465	2756			14677

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04504 W		149	65	04	17	205	1963		8466	0205	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		34	F04		035			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0382	3424	2722	0008561	0000	14651
208		OBS	0000	0382	3424	2722			14651
		STD	0010	0382	3424	2722	0008569	0009	14652
		STD	0020	0381	3424	2722	0008568	0017	14654
208		OBS	0025	0380	3424	2722			14654
		STD	0030	0378	3424	2723	0008518	0026	14654
		STD	0050	0373	3426	2725	0008366	0043	14655
208		OBS	0050	0373	3426	2725			14655
208		OBS	0074	0369	3428	2727			14658
		STD	0075	0366	3428	2727	0008169	0063	14657
208		OBS	0099	0327	3428	2731			14644
		STD	0100	0329	3429	2731	0007767	0083	14645
		STD	0125	0372	3450	2744	0006615	0101	14671
208		OBS	0148	0397	3464	2752			14687
		STD	0150	0398	3465	2753	0005772	0117	14688
208		OBS	T0198	0401	3478	2763			14699

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04508 W		149	65	04	17	214	1963		8467	0225	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F04		034			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0374	3427	2725	0008259	0000	14648
217		OBS	0000	0374	3427	2725			14648
		STD	0010	0372	3427	2725	0008278	0008	14649
		STD	0020	0370	3426	2725	0008298	0017	14649
217		OBS	0025	0369	3426	2725			14650
		STD	0030	0367	3427	2726	0008217	0025	14650
		STD	0050	0362	3428	2727	0008111	0041	14651
217		OBS	0050	0362	3428	2727			14651
		STD	0075	0362	3428	2727	0008131	0061	14655
217		OBS	0076	0361	3428	2728			14655
		STD	0100	0326	3434	2736	0007373	0081	14645
217		OBS	0101	0324	3434	2736			14644
		STD	0125	0376	3454	2747	0006354	0098	14673
		STD	0150	0409	3469	2755	0005584	0113	14693
217		OBS	0152	0411	3470	2756			14694
		STD	0200	0410	3481	2765	0004744	0139	14703
217		OBS	T0202	0410	3481	2765			14703

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04543 W		149	65	04	18	000	1963		8468	0285	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		32	F04		019			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0325	3420	2725	0008337	0000	14626
004	OBS	0000	0325	3420	2725			14626
	STD	0010	0325	3420	2725	0008344	0008	14628
	STD	0020	0325	3420	2725	0008351	0017	14629
004	OBS	0026	0325	3420	2725			14630
	STD	0030	0323	3420	2725	0008339	0025	14630
	STD	0050	0313	3420	2726	0008261	0042	14629
004	OBS	0051	0312	3420	2726			14629
	STD	0075	0304	3420	2727	0008205	0062	14629
004	OBS	0076	0304	3420	2727			14629
	STD	0100	0359	3446	2742	0006769	0081	14660
004	OBS	0102	0363	3448	2743			14663
	STD	0125	0409	3465	2752	0005860	0097	14688
	STD	0150	0435	3477	2759	0005257	0111	14705
004	OBS	0153	0436	3478	2759			14706
	STD	0200	0404	3484	2767	0004494	0135	14701
004	OBS	0204	0402	3484	2768			14701
	STD	0250	0391	3488	2772	0004070	0156	14704
004	OBS	T0255	0391	3488	2772			14705

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46475N	04606 W		149	66	04	18	019	1963		8469	0322	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		32	F04		015			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0331	3424	2727	0008088	0000	14629
022	OBS	0000	0331	3424	2727			14629
	STD	0010	0331	3424	2727	0008092	0008	14631
	STD	0020	0330	3424	2727	0008096	0016	14632
022	OBS	0025	0330	3424	2727			14633
	STD	0030	0327	3424	2728	0008074	0024	14632
	STD	0050	0320	3424	2728	0008026	0040	14633
022	OBS	0050	0320	3424	2728			14633
	STD	0075	0326	3424	2728	0008096	0061	14639
022	OBS	0076	0326	3424	2728			14639
	STD	0100	0324	3439	2740	0006969	0079	14645
022	OBS	0101	0324	3440	2741			14645
	STD	0125	0356	3453	2748	0006235	0096	14664
	STD	0150	0384	3465	2755	0005630	0111	14682
022	OBS	0152	0386	3466	2755			14683
	STD	0200	0421	3481	2764	0004830	0137	14708
022	OBS	0202	0422	3482	2764			14709
	STD	0250	0420	3490	2771	0004226	0159	14717
	STD	0300	0380	3490	2775	0003853	0180	14708
022	OBS	T0303	0376	3490	2775			14707

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	4648 N	04626 W		149	66	04	18	042	1963		8470	0615	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		34	F04		006			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0250	3413	2726	0008234	0000	14593
046		OBS	0000	0250	3413	2726			14593
		STD	0010	0250	3414	2726	0008175	0008	14594
		STD	0020	0249	3415	2727	0008117	0016	14596
046		OBS	0025	0249	3415	2727			14597
		STD	0030	0258	3416	2727	0008087	0024	14601
		STD	0050	0261	3418	2729	0007972	0041	14606
046		OBS	0050	0261	3418	2729			14606
		STD	0075	0191	3422	2738	0007133	0059	14580
046		OBS	0075	0191	3422	2738			14580
		STD	0100	0248	3444	2751	0005929	0076	14612
046		OBS	0100	0248	3444	2751			14612
		STD	0125	0288	3453	2754	0005608	0090	14635
		STD	0150	0329	3464	2759	0005171	0104	14658
046		OBS	0150	0329	3464	2759			14658
		STD	0200	0412	3490	2772	0004091	0127	14705
046		OBS	T0200	0412	3490	2772			14705
		STD	0250	0398	3490	2773	0003993	0147	14708
		STD	0300	0386	3490	2774	0003915	0167	14711
046		OBS	0300	0386	3490	2774			14711
		STD	0400	0370	3490	2776	0003839	0206	14721
046		OBS	0400	0370	3490	2776			14721
		STD	0500	0360	3489	2776	0003897	0244	14733
		STD	0600	0357	3488	2776	0004025	0284	14748
046		OBS	T0601	0357	3488	2776			14748

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46485N	04654 W		149	66	04	18	063	1963		8471	1225	11

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F03		-007			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0161	3400	2722	0008561	0000	14552
068		OBS	0000	0161	3400	2722			14552
		STD	0010	0159	3400	2722	0008552	0009	14553
		STD	0020	0158	3400	2722	0008544	0017	14554
068		OBS	0024	0157	3400	2723			14554
		STD	0030	0189	3407	2726	0008237	0025	14570
068		OBS	0048	0235	3422	2734			14595
		STD	0050	0228	3423	2735	0007367	0041	14593
068		OBS	0072	0177	3428	2743			14575
		STD	0075	0178	3429	2744	0006507	0058	14576
068		OBS	0096	0184	3434	2748			14582
		STD	0100	0185	3435	2748	0006117	0074	14584
		STD	0125	0194	3441	2753	0005738	0089	14592
068		OBS	0146	0201	3446	2756			14600
		STD	0150	0214	3449	2757	0005302	0103	14607
068		OBS	T0194	0330	3472	2766			14667
		STD	0200	0334	3473	2766	0004582	0128	14670
		STD	0250	0359	3481	2770	0004268	0150	14690
068		OBS	0291	0373	3486	2772			14703
		STD	0300	0374	3486	2773	0004068	0171	14705
068		OBS	0391	0381	3489	2774			14724
		STD	0400	0381	3489	2774	0004038	0211	14725
		STD	0500	0376	3487	2773	0004187	0252	14739
068		OBS	T0590	0371	3486	2773			14752
		STD	0600	0370	3486	2773	0004300	0295	14753
		STD	0700	0365	3488	2775	0004183	0337	14768
068		OBS	0787	0360	3490	2777			14780
		STD	0800	0359	3490	2777	0004068	0378	14782
		STD	0900	0354	3490	2778	0004095	0419	14797
068		OBS	T0984	0350	3490	2778			14809
		STD	1000	0349	3490	2778	0004119	0460	14811
068		OBS	T1081	0346	3490	2778			14824

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46475N	04706 W		149	67	04	18	087	1963		8472	0580	05

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F04		-007			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0107	3288	2646	0015789	0000	14414
091	OBS	0000	-0107	3288	2646			14414
	STD	0010	-0107	3288	2646	0015784	0016	14416
091	OBS	0019	-0106	3288	2646			14417
	STD	0020	-0112	3289	2647	0015685	0032	14415
	STD	0030	-0155	3300	2657	0014719	0047	14398
091	OBS	0037	-0164	3306	2662			14396
	STD	0050	-0122	3314	2668	0013719	0075	14419
091	OBS	0056	-0106	3320	2672			14428
	STD	0075	-0066	3350	2695	0011142	0106	14454
091	OBS	0075	-0066	3350	2695			14454
	STD	0100	0046	3380	2714	0009380	0132	14514
091	OBS	0112	0091	3393	2721			14538
	STD	0125	0129	3405	2728	0007995	0154	14559
	STD	0150	0192	3426	2741	0006867	0172	14594
091	OBS	T0150	0192	3426	2741			14594
	STD	0200	0260	3452	2756	0005485	0203	14635
091	OBS	0233	0292	3463	2762			14656
	STD	0250	0299	3465	2763	0004890	0229	14662
	STD	0300	0319	3470	2765	0004740	0253	14680
091	OBS	0322	0326	3472	2766			14686
	STD	0400	0347	3479	2769	0004424	0299	14709
	STD	0500	0364	3485	2773	0004238	0342	14734
091	OBS	T0516	0365	3486	2773			14737

731-298 O—64——11

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04720 W		149	67	04	18	096	1963		8473	0322	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		32	F03		001			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0099	3280	2639	0016427	0000	14416
100		OBS	0000	-0099	3280	2639			14416
		STD	0010	-0128	3284	2643	0016031	0016	14405
		STD	0020	-0147	3288	2647	0015668	0032	14398
100		OBS	0025	-0154	3290	2649			14396
		STD	0030	-0154	3292	2651	0015336	0048	14397
100		OBS	0049	-0155	3298	2655			14401
		STD	0050	-0155	3298	2656	0014836	0078	14401
100		OBS	0074	-0144	3306	2662			14411
		STD	0075	-0141	3307	2662	0014185	0114	14413
100		OBS	0099	-0073	3332	2680			14452
		STD	0100	-0070	3333	2681	0012415	0147	14454
		STD	0125	0002	3359	2699	0010743	0176	14495
100		OBS	0148	0053	3380	2713			14525
		STD	0150	0055	3381	2714	0009353	0201	14526
100		OBS	0197	0117	3412	2735			14566
		STD	0200	0121	3414	2736	0007273	0243	14569
		STD	0250	0193	3436	2750	0006009	0276	14612
100		OBS	T0296	0265	3454	2757			14653

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04737 W		149	67	04	18	114	1963		8474	0175	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		32	F03		002			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0099	3276	2636	0016734	0000	14416
116		OBS	0000	-0099	3276	2636			14416
		STD	0010	-0099	3276	2636	0016695	0017	14417
		STD	0020	-0100	3277	2637	0016657	0033	14419
116		OBS	0025	-0100	3277	2637			14420
		STD	0030	-0112	3279	2639	0016446	0050	14415
116		OBS	0049	-0144	3288	2647			14404
		STD	0050	-0145	3289	2648	0015574	0082	14404
116		OBS	0074	-0156	3302	2659			14405
		STD	0075	-0155	3302	2659	0014508	0120	14405
116		OBS	0099	-0140	3310	2665			14418
		STD	0100	-0139	3311	2665	0013882	0155	14418
		STD	0125	-0102	3330	2680	0012499	0188	14443
116		OBS	T0148	-0050	3348	2692			14473

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4646 N	04805 W		149	68	04	18	139	1963		8475	0115	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		32	F03		010			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M X 10^3	SOUND VELOCITY
		STD	0000	-0032	3304	2656	0014825	0000	14451
141		OBS	0000	-0032	3304	2656			14451
		STD	0010	-0034	3303	2656	0014874	0015	14452
		STD	0020	-0036	3303	2655	0014916	0030	14452
141		OBS	0026	-0037	3302	2655			14453
		STD	0030	-0038	3303	2655	0014895	0045	14453
		STD	0050	-0044	3306	2658	0014620	0074	14454
141		OBS	0051	-0044	3306	2658			14454
		STD	0075	-0084	3319	2670	0013445	0109	14441
141		OBS	0076	-0086	3320	2671			14441
		STD	0100	-0034	3349	2693	0011343	0140	14473
141		OBS	T0102	-0026	3352	2695			14477

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04843 W		149	68	04	18	165	1963		8476	0087	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		32	F04		015			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0008	3304	2655	0014925	0000	14462
168		OBS	0000	-0008	3304	2655			14462
		STD	0010	-0021	3303	2655	0014927	0015	14458
		STD	0020	-0032	3303	2655	0014932	0030	14454
168		OBS	0026	-0038	3302	2655			14452
		STD	0030	-0042	3302	2655	0014903	0045	14451
		STD	0050	-0056	3304	2657	0014717	0074	14448
168		OBS	0051	-0057	3304	2657			14448
		STD	0075	-0067	3320	2670	0013432	0110	14449
168		OBS	T0077	-0068	3322	2672			14449

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4713 N	04913 W		149	79	04	18	200	1963		8477	0087	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		32	F03		012			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0008	3300	2652	0015231	0000	14461
203	OBS	0000	-0008	3300	2652			14461
	STD	0010	-0010	3300	2652	0015219	0015	14462
	STD	0020	-0016	3300	2652	0015190	0030	14461
203	OBS	0025	-0020	3300	2652			14460
	STD	0030	-0029	3300	2653	0015116	0046	14457
203	OBS	0049	-0054	3301	2655			14448
	STD	0050	-0055	3301	2655	0014912	0076	14448
203	OBS	T0074	-0063	3312	2664			14450

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4712 N	04839 W		149	78	04	18	222	1963		8478	0100	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		32	F01		-006			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0070	3295	2650	0015371	0000	14432
224	OBS	0000	-0070	3295	2650			14432
	STD	0010	-0074	3295	2651	0015321	0015	14432
	STD	0020	-0079	3296	2651	0015268	0031	14431
224	OBS	0025	-0083	3296	2652			14430
	STD	0030	-0091	3297	2653	0015131	0046	14428
	STD	0050	-0109	3301	2657	0014755	0076	14423
224	OBS	0050	-0109	3301	2657			14423
	STD	0075	-0106	3327	2678	0012758	0110	14432
224	OBS	0076	-0104	3328	2678			14433
224	OBS	T0091	-0049	3342	2688			14463

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4713 N	04802 W		149	78	04	19	006	1963		8479	0170	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F04		-006			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0106	3286	2644	0015945	0000	14414
009		OBS	0000	-0106	3286	2644			14414
		STD	0010	-0106	3286	2644	0015970	0016	14416
		STD	0020	-0108	3285	2644	0015988	0032	14416
009		OBS	0026	-0111	3285	2644			14416
		STD	0030	-0113	3285	2644	0015967	0048	14416
		STD	0050	-0130	3286	2645	0015844	0080	14411
009		OBS	0051	-0131	3286	2645			14411
		STD	0075	-0164	3299	2656	0014740	0118	14401
009		OBS	0076	-0165	3300	2657			14401
		STD	0100	-0158	3311	2666	0013815	0154	14410
009		OBS	0102	-0155	3312	2667			14411
		STD	0125	-0091	3329	2679	0012630	0187	14448
		STD	0150	0037	3354	2693	0011303	0217	14514
009		OBS	T0153	0057	3358	2695			14524

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4719 N	047435W		149	77	04	19	023	1963		8480	0225	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		27	F02		-006			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0100	3284	2643	0016117	0000	14417
026		OBS	0000	-0100	3284	2643			14417
		STD	0010	-0100	3285	2643	0016048	0016	14418
		STD	0020	-0101	3286	2644	0015979	0032	14420
026		OBS	0025	-0101	3286	2644			14420
		STD	0030	-0120	3287	2646	0015793	0048	14413
		STD	0050	-0170	3292	2651	0015299	0079	14393
026		OBS	0051	-0171	3292	2651			14393
		STD	0075	-0167	3298	2656	0014825	0117	14399
026		OBS	0076	-0166	3298	2656			14400
		STD	0100	-0136	3313	2667	0013722	0152	14420
026		OBS	0102	-0133	3314	2668			14422
		STD	0125	-0089	3328	2678	0012714	0185	14448
		STD	0150	-0017	3352	2694	0011177	0215	14489
026		OBS	0152	-0010	3354	2695			14493
		STD	0200	0201	3425	2739	0007032	0261	14606
026		OBS	T0203	0217	3430	2742			14614

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47175N	04711 W		149	77	04	19	049	1963		8481	0295	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		27	F03		-006			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	-0105	3286	2644	0015948	0000	14414
054	OBS	0000	-0105	3286	2644			14414
	STD	0010	-0103	3286	2645	0015916	0016	14417
	STD	0020	-0102	3287	2645	0015884	0032	14419
054	OBS	0025	-0101	3287	2645			14421
	STD	0030	-0115	3288	2646	0015746	0048	14415
	STD	0050	-0150	3297	2655	0014947	0078	14403
054	OBS	0050	-0150	3297	2655			14403
	STD	0075	-0141	3316	2670	0013495	0114	14414
054	OBS	0075	-0141	3316	2670			14414
054	OBS	0099	-0066	3344	2690			14457
	STD	0100	-0064	3345	2691	0011522	0145	14458
	STD	0125	-0017	3365	2705	0010193	0172	14487
054	OBS	0149	0029	3383	2717			14515
	STD	0150	0031	3384	2718	0008989	0196	14516
054	OBS	0199	0128	3420	2741			14573
	STD	0200	0130	3421	2741	0006806	0236	14574
054	OBS	T0249	0262	3444	2749			14643

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4718 N	04650 W		149	76	04	19	067	1963		8482	1065	09

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		27	F02		-003			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0022	3320	2669	0013642	0000	14458
072		OBS	0000	-0022	3320	2669			14458
		STD	0010	-0022	3320	2669	0013639	0014	14459
		STD	0020	-0022	3320	2669	0013636	0027	14461
072		OBS	0023	-0022	3320	2669			14462
		STD	0030	-0044	3332	2679	0012623	0040	14454
072		OBS	0046	-0050	3358	2700			14458
		STD	0050	-0031	3364	2705	0010226	0063	14468
072		OBS	0068	0041	3388	2720			14507
		STD	0075	0061	3394	2724	0008400	0087	14518
072		OBS	0091	0105	3406	2731			14543
		STD	0100	0132	3412	2734	0007479	0106	14557
		STD	0125	0197	3429	2743	0006668	0124	14592
072		OBS	0137	0223	3436	2746			14607
		STD	0150	0247	3444	2751	0005949	0140	14620
072		OBS	T0183	0296	3460	2759			14649
		STD	0200	0303	3463	2761	0005042	0167	14655
		STD	0250	0322	3470	2765	0004731	0192	14673
072		OBS	0275	0331	3472	2765			14681
		STD	0300	0339	3473	2765	0004711	0215	14689
072		OBS	0368	0358	3476	2766			14708
		STD	0400	0364	3478	2767	0004674	0262	14716
		STD	0500	0380	3482	2769	0004633	0309	14740
072		OBS	T0554	0385	3484	2770			14752
		STD	0600	0386	3485	2770	0004560	0355	14760
		STD	0700	0387	3487	2772	0004514	0400	14777
072		OBS	0744	0387	3488	2773			14784
		STD	0800	0383	3488	2773	0004490	0445	14792
		STD	0900	0370	3488	2774	0004427	0490	14803
072		OBS	T0938	0363	3488	2775			14807

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4720 N	04619 W		149	76	04	19	108	1963		8483	0630	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		29	F03		024			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0189	3393	2715	0009288	0000	14563
113		OBS	0000	0189	3393	2715			14563
		STD	0010	0187	3393	2715	0009246	0009	14564
		STD	0020	0186	3394	2715	0009212	0018	14565
113		OBS	0025	0185	3394	2716			14566
		STD	0030	0185	3398	2719	0008889	0028	14567
		STD	0050	0184	3414	2732	0007678	0044	14572
113		OBS	0050	0184	3414	2732			14572
		STD	0075	0254	3432	2741	0006871	0062	14609
113		OBS	0075	0254	3432	2741			14609
		STD	0100	0283	3452	2754	0005623	0078	14629
113		OBS	0100	0283	3452	2754			14629
		STD	0125	0311	3460	2758	0005287	0092	14646
		STD	0150	0340	3468	2761	0004974	0104	14664
113		OBS	0150	0340	3468	2761			14664
		STD	0200	0401	3484	2768	0004426	0128	14700
113		OBS	T0200	0401	3484	2768			14700
		STD	0250	0399	3487	2771	0004228	0150	14708
		STD	0300	0392	3489	2773	0004053	0170	14713
113		OBS	0300	0392	3489	2773			14713
		STD	0400	0365	3487	2774	0004011	0211	14718
113		OBS	0400	0365	3487	2774			14718
		STD	0500	0352	3486	2775	0004036	0251	14729
		STD	0600	0352	3486	2775	0004120	0292	14745
113		OBS	T0600	0352	3486	2775			14745

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4721 N	04553 W		149	75	04	19	132	1963		8484	0325	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		29	F03		032			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0280	3410	2721	0008705	0000	14605
135		OBS	0000	0280	3410	2721			14605
		STD	0010	0280	3410	2721	0008707	0009	14607
		STD	0020	0279	3410	2721	0008710	0017	14608
135		OBS	0025	0279	3410	2721			14609
		STD	0030	0290	3412	2721	0008656	0026	14615
		STD	0050	0318	3418	2724	0008460	0043	14631
135		OBS	0050	0318	3418	2724			14631
		STD	0075	0316	3420	2725	0008317	0064	14634
135		OBS	0076	0315	3420	2726			14634
		STD	0100	0248	3420	2731	0007741	0084	14609
135		OBS	0101	0247	3420	2732			14609
		STD	0125	0300	3436	2740	0006995	0103	14638
		STD	0150	0345	3451	2747	0006300	0119	14663
135		OBS	0151	0347	3452	2748			14665
		STD	0200	0402	3476	2761	0005073	0148	14699
135		OBS	0201	0403	3476	2761			14700
		STD	0250	0395	3481	2766	0004645	0172	14705
		STD	0300	0387	3486	2771	0004243	0194	14711
135		OBS	T0302	0387	3486	2771			14711

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4721 N	04529 W		149	75	04	19	152	1963		8485	0276	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F03		034			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0261	3416	2727	0008095	0000	14598
155		OBS	0000	0261	3416	2727			14598
		STD	0010	0256	3415	2727	0008121	0008	14597
		STD	0020	0252	3415	2727	0008147	0016	14597
155		OBS	0026	0250	3414	2726			14597
		STD	0030	0249	3414	2727	0008165	0024	14597
		STD	0050	0243	3414	2727	0008130	0041	14598
155		OBS	0051	0243	3414	2727			14598
		STD	0075	0286	3420	2728	0008046	0061	14622
155		OBS	0077	0291	3422	2729			14624
		STD	0100	0355	3454	2749	0006129	0079	14660
155		OBS	0103	0362	3457	2750			14664
		STD	0125	0393	3468	2756	0005472	0093	14682
		STD	0150	0412	3477	2761	0005015	0106	14695
155		OBS	0154	0413	3478	2762			14696
		STD	0200	0395	3482	2767	0004551	0130	14697
155		OBS	0206	0393	3482	2767			14697
		STD	0250	0386	3484	2770	0004318	0152	14702
155		OBS	T0257	0386	3484	2770			14703

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4723 N	04513 W		149	75	04	19	169	1963		8486	0240	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		27	F04		041			

MESSENGER TIME HR 1/10	CAST or NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0332	3420	2724	0008399	0000	14629
172		OBS	0000	0332	3420	2724			14629
		STD	0010	0330	3421	2725	0008313	0008	14630
		STD	0020	0328	3422	2726	0008227	0017	14631
172		OBS	0025	0327	3423	2727			14631
		STD	0030	0327	3424	2728	0008073	0025	14632
		STD	0050	0326	3428	2731	0007778	0041	14636
172		OBS	0050	0326	3428	2731			14636
		STD	0075	0332	3438	2738	0007098	0059	14644
172		OBS	0075	0332	3438	2738			14644
		STD	0100	0372	3454	2747	0006293	0076	14667
172		OBS	0100	0372	3454	2747			14667
		STD	0125	0383	3463	2753	0005747	0091	14677
172		OBS	0149	0390	3470	2758			14685
		STD	0150	0390	3470	2758	0005301	0105	14685
172		OBS	T0199	0394	3482	2767			14696

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4726 N	04502 W		149	75	04	19	181	1963		8487	0230	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		27	F04		039			

MESSENGER TIME HR 1/10	CAST or NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0351	3428	2728	0007968	0000	14638
184		OBS	0000	0351	3428	2728			14638
		STD	0010	0349	3427	2728	0008048	0008	14639
		STD	0020	0347	3426	2727	0008128	0016	14639
184		OBS	0025	0346	3425	2727			14640
		STD	0030	0333	3426	2729	0007978	0024	14635
		STD	0050	0301	3432	2736	0007255	0039	14626
184		OBS	0050	0301	3432	2736			14626
		STD	0075	0305	3441	2743	0006628	0057	14633
184		OBS	0075	0305	3441	2743			14633
		STD	0100	0301	3452	2752	0005781	0072	14636
184		OBS	0100	0301	3452	2752			14636
		STD	0125	0350	3463	2756	0005440	0086	14663
		STD	0150	0382	3474	2762	0004964	0099	14682
184		OBS	0151	0383	3474	2762			14683
		STD	0200	0398	3484	2768	0004394	0123	14699
184		OBS	T0201	0398	3484	2768			14699

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	4729 N	04514 W		149	75	04	19	191	1963		8488	0240	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		32	F04		030			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0387	3428	2725	0008307	0000	14653
195		OBS	0000	0387	3428	2725			14653
		STD	0010	0385	3428	2725	0008301	0008	14654
		STD	0020	0384	3428	2725	0008294	0017	14655
195		OBS	0025	0383	3428	2725			14656
		STD	0030	0373	3429	2727	0008139	0025	14653
		STD	0050	0351	3432	2732	0007706	0041	14647
195		OBS	0050	0351	3432	2732			14647
		STD	0075	0363	3450	2745	0006486	0058	14659
195		OBS	0075	0363	3450	2745			14659
		STD	0100	0295	3452	2753	0005728	0074	14634
195		OBS	0100	0295	3452	2753			14634
		STD	0125	0345	3464	2758	0005302	0087	14661
195		OBS	0125	0345	3464	2758			14661
		STD	0150	0343	3468	2761	0005003	0100	14665
195		OBS	0150	0343	3468	2761			14665
		STD	0200	0394	3484	2769	0004353	0124	14697
195		OBS	T0200	0394	3484	2769			14697

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47405N	04538 W		149	75	04	19	221	1963		8489	0309	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		27	F04		003			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0319	3420	2725	0008284	0000	14623
224		OBS	0000	0319	3420	2725			14623
		STD	0010	0319	3420	2725	0008287	0008	14625
		STD	0020	0318	3420	2725	0008290	0017	14626
224		OBS	0025	0318	3420	2725			14627
		STD	0030	0303	3420	2726	0008179	0025	14621
		STD	0050	0251	3419	2730	0007815	0041	14602
224		OBS	0050	0251	3419	2730			14602
224		OBS	0074	0202	3424	2738			14585
		STD	0075	0200	3424	2739	0007034	0059	14585
224		OBS	0099	0186	3428	2743			14583
		STD	0100	0192	3429	2743	0006620	0076	14586
		STD	0125	0322	3454	2752	0005839	0092	14650
224		OBS	0149	0401	3470	2757			14690
		STD	0150	0402	3470	2757	0005422	0106	14690
224		OBS	0199	0423	3482	2764			14709
		STD	0200	0423	3482	2764	0004806	0132	14709
		STD	0250	0418	3484	2766	0004646	0155	14715
224		OBS	T0298	0388	3486	2771			14711

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47445N	04549 W		149	75	04	19	237	1963		8490	0448	04

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		29	F02		-007			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0292	3418	2726	0008201	0000	14612
242		OBS	0000	0292	3418	2726			14612
		STD	0010	0291	3417	2725	0008258	0008	14613
		STD	0020	0290	3416	2725	0008314	0017	14614
242		OBS	0025	0289	3416	2725			14614
		STD	0030	0271	3416	2726	0008225	0025	14607
		STD	0050	0220	3414	2729	0007947	0041	14588
242		OBS	0050	0220	3414	2729			14588
		STD	0075	0206	3426	2740	0006943	0060	14588
242		OBS	0075	0206	3426	2740			14588
		STD	0100	0306	3453	2753	0005750	0075	14639
242		OBS	0100	0306	3453	2753			14639
		STD	0125	0382	3470	2759	0005212	0089	14678
		STD	0150	0426	3482	2764	0004787	0102	14702
242		OBS	0150	0426	3482	2764			14702
		STD	0200	0415	3488	2770	0004272	0124	14706
242		OBS	T0200	0415	3488	2770			14706
		STD	0250	0391	3488	2772	0004070	0145	14704
242		OBS	0299	0375	3488	2774			14706
		STD	0300	0375	3488	2774	0003951	0165	14706
242		OBS	T0398	0363	3488	2775			14717

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4751 N	04603 W		149	76	04	20	023	1963		8491	1040	10

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		27	F04		-009			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0262	3434	2741	0006743	0000	14601
028		OBS	0000	0262	3434	2741			14601
		STD	0010	0258	3435	2742	0006655	0007	14601
		STD	0020	0255	3436	2743	0006569	0013	14601
028		OBS	0024	0254	3436	2744			14601
		STD	0030	0254	3436	2744	0006543	0020	14602
028		OBS	0049	0248	3436	2744			14603
		STD	0050	0246	3436	2745	0006475	0033	14602
028		OBS	0073	0223	3440	2749			14597
		STD	0075	0225	3441	2750	0005957	0048	14598
028		OBS	0098	0248	3448	2754			14613
		STD	0100	0250	3449	2754	0005568	0063	14614
		STD	0125	0281	3456	2757	0005320	0076	14633
028		OBS	0145	0306	3462	2760			14647
		STD	0150	0314	3464	2761	0005032	0089	14652
028		OBS	T0194	0366	3480	2768			14683
		STD	0200	0367	3480	2768	0004364	0113	14685
		STD	0250	0371	3482	2770	0004292	0135	14695
028		OBS	0292	0372	3484	2771			14703
		STD	0300	0372	3484	2771	0004197	0156	14704
028		OBS	0389	0366	3488	2775			14717
		STD	0400	0365	3488	2775	0003937	0196	14718
		STD	0500	0356	3488	2776	0003929	0236	14731
028		OBS	T0584	0350	3488	2776			14742
		STD	0600	0349	3488	2776	0003939	0275	14744
		STD	0700	0345	3488	2777	0003978	0315	14759
028		OBS	0780	0343	3488	2777			14772
		STD	0800	0343	3488	2777	0004037	0355	14775
		STD	0900	0343	3488	2777	0004118	0396	14792
028		OBS	T0977	0343	3488	2777			14805

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4759 N	04622 W		149	76	04	20	047	1963		8492	1200	10

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		27	F04		-009			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0180	3400	2721	0008693	0000	14560
052		OBS	0000	0180	3400	2721			14560
		STD	0010	0177	3402	2722	0008554	0009	14561
		STD	0020	0175	3403	2724	0008421	0017	14562
052		OBS	0025	0174	3404	2724			14562
		STD	0030	0173	3407	2727	0008125	0025	14563
		STD	0050	0171	3420	2738	0007129	0041	14567
052		OBS	0050	0171	3420	2738			14567
		STD	0075	0247	3442	2749	0006058	0057	14608
052		OBS	0075	0247	3442	2749			14608
		STD	0100	0262	3448	2753	0005744	0072	14619
052		OBS	0100	0262	3448	2753			14619
		STD	0125	0289	3460	2760	0005089	0085	14637
052		OBS	0149	0309	3469	2765			14650
		STD	0150	0310	3469	2765	0004611	0098	14651
052		OBS	T0199	0335	3476	2768			14671
		STD	0200	0335	3476	2768	0004360	0120	14671
		STD	0250	0345	3479	2770	0004269	0142	14684
052		OBS	0299	0354	3482	2771			14696
		STD	0300	0354	3482	2771	0004188	0163	14696
052		OBS	0399	0371	3484	2771			14720
		STD	0400	0371	3484	2771	0004298	0205	14720
		STD	0500	0371	3485	2772	0004312	0248	14737
		STD	0600	0371	3486	2773	0004326	0291	14754
052		OBS	T0600	0371	3486	2773			14754
		STD	0700	0367	3486	2773	0004369	0335	14768
052		OBS	0792	0363	3486	2773			14782
		STD	0800	0363	3486	2773	0004410	0379	14783
		STD	0900	0357	3485	2773	0004500	0423	14797
052		OBS	T0979	0352	3484	2773			14808

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	4819 N	04556 W		149	85	04	20	085	1963		8493	1180	10

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
			F00		-007			

MESSENGER TIME HR 1/10	or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0204	3408	2725	0008260	0000	14572
090		OBS	0000	0204	3408	2725			14572
		STD	0010	0212	3410	2727	0008149	0008	14577
		STD	0020	0226	3413	2727	0008086	0016	14585
090		OBS	0026	0238	3414	2727			14592
		STD	0030	0257	3420	2731	0007777	0024	14602
		STD	0050	0315	3443	2744	0006549	0039	14633
090		OBS	0052	0318	3444	2744			14635
		STD	0075	0303	3448	2749	0006121	0054	14633
090		OBS	0076	0301	3448	2749			14632
		STD	0100	0293	3449	2751	0005940	0069	14633
090		OBS	0104	0292	3450	2752			14633
		STD	0125	0325	3458	2755	0005566	0084	14652
		STD	0150	0351	3466	2759	0005230	0097	14668
090		OBS	0156	0355	3468	2760			14671
		STD	0200	0358	3475	2765	0004665	0122	14680
090		OBS	T0208	0359	3476	2766			14682
		STD	0250	0376	3484	2771	0004215	0144	14698
		STD	0300	0388	3489	2773	0004011	0165	14711
094		OBS	T0313	0390	3490	2774			14715
		STD	0400	0386	3488	2773	0004136	0206	14727
094		OBS	0417	0385	3488	2773			14729
		STD	0500	0380	3486	2773	0004186	0247	14741
		STD	0600	0374	3486	2774	0004210	0289	14755
094		OBS	T0626	0372	3486	2774			14759
		STD	0700	0367	3488	2775	0004220	0331	14769
		STD	0800	0361	3488	2775	0004239	0374	14783
094		OBS	0833	0359	3488	2775			14787
		STD	0900	0355	3487	2775	0004329	0416	14797
		STD	1000	0350	3484	2773	0004575	0461	14811
094		OBS	T1038	0348	3482	2772			14816

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4838 N	04533 W		149	85	04	20	122	1963		8494	1100	10

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
			F00		024			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0309	3430	2734	0007441	0000	14620
127	OBS	0000	0309	3430	2734			14620
	STD	0010	0306	3434	2738	0007120	0007	14621
	STD	0020	0302	3437	2740	0006866	0014	14622
127	OBS	0025	0300	3438	2741			14622
	STD	0030	0298	3438	2742	0006732	0021	14622
	STD	0050	0290	3440	2744	0006556	0034	14622
127	OBS	0050	0290	3440	2744			14622
	STD	0075	0282	3444	2748	0006201	0050	14623
127	OBS	0075	0282	3444	2748			14623
	STD	0100	0282	3447	2750	0005991	0066	14628
127	OBS	0100	0282	3447	2750			14628
	STD	0125	0279	3450	2752	0005793	0080	14631
	STD	0150	0276	3452	2754	0005602	0095	14634
127	OBS	0151	0276	3452	2755			14634
	STD	0200	0355	3473	2764	0004786	0120	14679
127	OBS	T0202	0357	3474	2764			14680
	STD	0250	0372	3479	2767	0004563	0144	14695
	STD	0300	0387	3484	2769	0004394	0166	14711
127	OBS	0302	0388	3484	2769			14711
	STD	0400	0391	3490	2774	0004076	0209	14729
127	OBS	0404	0391	3490	2774			14730
	STD	0500	0382	3489	2774	0004157	0250	14742
	STD	0600	0372	3487	2773	0004250	0292	14754
127	OBS	T0605	0371	3487	2773			14755
	STD	0700	0366	3486	2773	0004354	0335	14768
	STD	0800	0361	3485	2773	0004457	0379	14783
127	OBS	0806	0361	3485	2773			14783
	STD	0900	0353	3486	2774	0004387	0423	14796
	STD	1000	0343	3487	2776	0004279	0466	14808
127	OBS	T1007	0342	3487	2776			14809

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4900 N	04500 W		149	95	04	20	161	1963		8495	1650	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
			F00		038			

MESSENGER TIME HR 1/10	⊀ or ⊀ CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0299	3417	2725	0008336	0000	14614
166		OBS	0000	0299	3417	2725			14614
		STD	0010	0286	3418	2727	0008155	0008	14610
		STD	0020	0273	3420	2729	0007900	0016	14607
166		OBS	0025	0266	3422	2732			14605
		STD	0030	0294	3425	2731	0007709	0024	14618
		STD	0050	0339	3434	2734	0007445	0039	14642
166		OBS	0050	0339	3434	2734			14642
		STD	0075	0249	3442	2749	0006075	0056	14608
166		OBS	0075	0249	3442	2749			14608
		STD	0100	0292	3459	2759	0005174	0070	14634
166		OBS	0100	0292	3459	2759			14634
		STD	0125	0309	3464	2761	0004937	0083	14646
		STD	0150	0323	3470	2764	0004679	0095	14657
166		OBS	0151	0324	3470	2765			14657
		STD	0200	0347	3476	2767	0004485	0118	14676
166		OBS	0201	0347	3476	2767			14676
		STD	0250	0355	3479	2769	0004384	0140	14688
		STD	0300	0363	3482	2770	0004281	0162	14700
166		OBS	0302	0363	3482	2770			14700
		STD	0400	0371	3482	2769	0004446	0205	14720
166		OBS	0403	0371	3482	2769			14720
		STD	0500	0369	3485	2772	0004294	0249	14736
		STD	0600	0366	3488	2775	0004131	0291	14752
166		OBS	T0603	0366	3488	2775			14752
		STD	0700	0360	3487	2775	0004214	0333	14766
		STD	0800	0353	3486	2774	0004300	0375	14779
166		OBS	0803	0353	3486	2774			14780
		STD	0900	0349	3486	2775	0004335	0419	14794
		STD	1000	0345	3486	2775	0004370	0462	14809
166		OBS	T1002	0345	3486	2775			14809
		STD	1100	0342	3487	2776	0004354	0506	14825
		STD	1200	0340	3488	2777	0004350	0549	14841
		STD	1300	0339	3488	2778	0004356	0593	14857
		STD	1400	0339	3489	2778	0004375	0636	14874
		STD	1500	0339	3490	2779	0004393	0680	14891
166		OBS	T1502	0339	3490	2779			14891

731-298 O—64——12

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4910 N	04540 W		149	95	04	20	203	1963		8496	2740	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
			F00		019			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN M. X 10³	SOUND VELOCITY
		STD	0000	0349	3442	2740	0006895	0000	14639
208		OBS	0000	0349	3442	2740			14639
		STD	0010	0328	3442	2742	0006711	0007	14632
		STD	0020	0310	3442	2744	0006558	0013	14626
208		OBS	0024	0304	3442	2744			14624
		STD	0030	0298	3442	2745	0006460	0020	14622
208		OBS	0049	0279	3442	2746			14617
		STD	0050	0276	3441	2746	0006360	0033	14616
208		OBS	0073	0255	3439	2746			14610
		STD	0075	0261	3441	2747	0006249	0049	14614
208		OBS	0098	0319	3462	2759			14645
		STD	0100	0321	3463	2759	0005134	0063	14647
		STD	0125	0347	3474	2765	0004570	0075	14663
208		OBS	0147	0362	3480	2769			14674
		STD	0150	0362	3480	2769	0004289	0086	14675
208		OBS	T0196	0369	3480	2768			14685
		STD	0200	0370	3480	2768	0004394	0108	14686
		STD	0250	0374	3483	2770	0004285	0129	14696
208		OBS	0294	0376	3485	2771			14705
		STD	0300	0376	3485	2771	0004186	0151	14706
208		OBS	0392	0372	3485	2772			14719
		STD	0400	0371	3485	2772	0004224	0193	14720
		STD	0500	0365	3485	2772	0004285	0235	14734
208		OBS	T0589	0360	3484	2772			14747
		STD	0600	0360	3484	2772	0004348	0278	14749
		STD	0700	0357	3485	2773	0004325	0322	14764
208		OBS	0783	0354	3486	2774			14777
		STD	0800	0353	3486	2775	0004275	0365	14779
		STD	0900	0348	3488	2776	0004190	0407	14794
208		OBS	T0975	0345	3489	2778			14805
		STD	1000	0345	3489	2778	0004131	0449	14810
		STD	1100	0344	3490	2778	0004159	0490	14826
		STD	1200	0344	3490	2779	0004187	0532	14843
		STD	1300	0343	3491	2779	0004214	0574	14859
		STD	1400	0342	3492	2780	0004241	0616	14876
208		OBS	T1466	0342	3492	2780			14887

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	4921 N	04620 W		149	96	04	21	003	1963		8497	3100	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
			F00		025			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN M X 10³	SOUND VELOCITY
		STD	0000	0356	3442	2739	0006960	0000	14642
009		OBS	0000	0356	3442	2739			14642
		STD	0010	0348	3443	2741	0006826	0007	14641
		STD	0020	0341	3444	2742	0006709	0014	14639
009		OBS	0023	0340Q	3444	2742Q			
		STD	0030	0334	3444	2743	0006630	0020	14638
009		OBS	0046	0322	3444	2744			14636
		STD	0050	0319	3444	2744	0006509	0033	14635
009		OBS	0069	0306	3444	2745			14632
		STD	0075	0299	3446	2748	0006198	0049	14631
009		OBS	0092	0296	3454	2754			14633
		STD	0100	0325	3462	2758	0005246	0064	14648
		STD	0125	0388	3479	2765	0004596	0076	14681
009		OBS	0139	0406	3484	2767			14692
		STD	0150	0398	3483	2767	0004421	0087	14690
009		OBS	T0185	0377	3480	2767			14687
		STD	0200	0373	3481	2768	0004364	0109	14688
		STD	0250	0365	3485	2772	0004029	0130	14693
009		OBS	0276	0364	3486	2773			14697
		STD	0300	0368	3487	2774	0003954	0150	14703
009		OBS	0371	0376	3488	2774			14718
		STD	0400	0375	3488	2774	0004027	0190	14722
		STD	0500	0372	3489	2775	0004047	0230	14738
009		OBS	T0558	0370	3489	2775			14747
		STD	0600	0368	3489	2775	0004055	0271	14753
		STD	0700	0363	3490	2776	0004042	0311	14767
009		OBS	0747	0361	3490	2777			14774
		STD	0800	0359	3490	2777	0004066	0352	14782
		STD	0900	0355	3490	2777	0004106	0393	14797
009		OBS	T0936	0354	3490	2778			14803
		STD	1000	0352	3490	2778	0004154	0434	14813
		STD	1100	0350	3490	2778	0004212	0476	14829
		STD	1200	0348	3490	2778	0004269	0518	14844
		STD	1300	0347	3490	2778	0004336	0561	14861
		STD	1400	0346	3490	2778	0004403	0605	14877
009		OBS	T1421	0346	3490	2778			14881

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4857 N	04644 W		149	86	04	21	040	1963		8498	2760	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F01		027			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0379	3448	2742	0006725	0000	14653
047		OBS	0000	0379	3448	2742			14653
		STD	0010	0370	3448	2743	0006648	0007	14651
		STD	0020	0361	3448	2743	0006571	0013	14648
047		OBS	0024	0357	3448	2744			14647
		STD	0030	0350	3447	2744	0006551	0020	14645
047		OBS	0049	0332	3446	2745			14641
		STD	0050	0331	3446	2745	0006460	0033	14640
047		OBS	0073	0323	3448	2747			14641
		STD	0075	0324	3449	2748	0006193	0049	14642
047		OBS	0098	0331	3460	2756			14650
		STD	0100	0334	3462	2757	0005329	0063	14652
		STD	0125	0367	3477	2766	0004538	0075	14672
047		OBS	0145	0381	3484	2770			14682
		STD	0150	0379	3483	2769	0004229	0086	14682
047		OBS	T0194	0368	3480	2768			14684
		STD	0200	0369	3480	2768	0004384	0108	14686
		STD	0250	0373	3482	2769	0004357	0130	14696
047		OBS	0292	0375	3483	2770			14704
		STD	0300	0375	3483	2770	0004318	0151	14705
047		OBS	0388	0372	3484	2771			14719
		STD	0400	0371	3484	2771	0004291	0194	14720
		STD	0500	0366	3485	2773	0004244	0237	14735
047		OBS	T0582	0362	3486	2774			14747
		STD	0600	0361	3485	2773	0004291	0280	14749
		STD	0700	0357	3483	2772	0004481	0324	14764
047		OBS	0777	0354	3482	2771			14775
		STD	0800	0353	3482	2771	0004579	0369	14779
		STD	0900	0350	3483	2773	0004546	0415	14794
047		OBS	T0972	0348	3484	2773			14805
		STD	1000	0347	3484	2774	0004533	0460	14810
		STD	1100	0345	3485	2774	0004559	0505	14826
		STD	1200	0343	3485	2775	0004585	0551	14842
		STD	1300	0342	3485	2775	0004621	0597	14858
		STD	1400	0340	3486	2775	0004644	0644	14874
047		OBS	T1468	0340	3486	2776			14886

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4840 N	04659 W		149	86	04	21	069	1963		8499	2620	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F02		038			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0245	3435	2744	0006530	0000	14593
075		OBS	0000	0245	3435	2744			14593
		STD	0010	0245	3435	2743	0006566	0007	14595
		STD	0020	0243	3434	2743	0006585	0013	14596
075		OBS	0025	0241	3434	2743			14596
		STD	0030	0237	3435	2744	0006482	0020	14595
		STD	0050	0223	3438	2748	0006156	0032	14592
075		OBS	0050	0223	3438	2748			14592
		STD	0075	0205	3442	2753	0005725	0047	14589
075		OBS	0075	0205	3442	2753			14589
		STD	0100	0232	3448	2755	0005497	0061	14606
075		OBS	0100	0232	3448	2755			14606
		STD	0125	0304	3462	2760	0005073	0074	14643
		STD	0150	0349	3472	2764	0004760	0087	14668
075		OBS	0150	0349	3472	2764			14668
		STD	0200	0360	3480	2769	0004310	0109	14682
075		OBS	T0200	0360	3480	2769			14682
		STD	0250	0366	3482	2770	0004262	0131	14693
		STD	0300	0372	3484	2771	0004218	0152	14704
075		OBS	0301	0372	3484	2771			14704
		STD	0400	0369	3486	2773	0004128	0194	14720
075		OBS	0401	0369	3486	2773			14720
		STD	0500	0363	3485	2773	0004228	0235	14733
		STD	0600	0357	3484	2772	0004324	0278	14747
075		OBS	T0602	0357	3484	2772			14748
		STD	0700	0354	3485	2773	0004332	0322	14763
		STD	0800	0350	3485	2774	0004339	0365	14778
075		OBS	0803	0350	3485	2774			14778
		STD	0900	0348	3485	2774	0004435	0409	14794
		STD	1000	0346	3484	2774	0004530	0454	14809
075		OBS	T1005	0346	3484	2774			14810
		STD	1100	0344	3485	2774	0004540	0499	14825
		STD	1200	0342	3485	2775	0004558	0544	14841
		STD	1300	0340	3486	2775	0004567	0590	14857
		STD	1400	0338	3486	2776	0004575	0636	14873
		STD	1500	0335	3487	2777	0004570	0681	14889
075		OBS	T1515	0335	3487	2777			14891

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4819 N	04720 W		149	87	04	21	103	1963		8500	1740	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		09	F04		028			

MESSENGER TIME HR 1 10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0088	3368	2701	0010532	0000	14515
113		OBS	0000	0088	3368	2701			14515
		STD	0010	0070	3370	2704	0010308	0010	14508
		STD	0020	0058	3371	2706	0010119	0021	14505
113		OBS	0025	0054	3372	2707			14504
		STD	0030	0055	3377	2711	0009662	0031	14506
		STD	0050	0060	3396	2726	0008242	0048	14514
113		OBS	0050	0060	3396	2726			14514
		STD	0075	0136	3420	2740	0006894	0067	14556
113		OBS	0075	0136	3420	2740			14556
		STD	0100	0220	3432	2743	0006609	0084	14599
113		OBS	0100	0220	3432	2743			14599
		STD	0125	0285	3455	2756	0005430	0099	14634
113		OBS	0149	0327	3470	2764			14658
		STD	0150	0328	3470	2764	0004703	0112	14659
113		OBS	T0199	0349	3476	2767			14677
		STD	0200	0349	3476	2767	0004496	0135	14677
		STD	0250	0360	3480	2769	0004354	0157	14690
		STD	0300	0371	3484	2771	0004209	0178	14704
113		OBS	0300	0371	3484	2771			14704
		STD	0400	0378	3486	2772	0004222	0221	14723
113		OBS	0402	0378	3486	2772			14724
		STD	0500	0378	3485	2771	0004375	0264	14740
		STD	0600	0377	3484	2771	0004533	0308	14756
113		OBS	T0608	0377	3484	2770			14757
		STD	0700	0371	3484	2771	0004562	0354	14770
		STD	0800	0366	3484	2772	0004592	0399	14784
113		OBS	0813	0365	3484	2772			14786
		STD	0900	0361	3486	2773	0004494	0445	14799
		STD	1000	0356	3488	2775	0004378	0489	14814
113		OBS	T1019	0355	3488	2776			14817
		STD	1100	0352	3488	2776	0004406	0533	14829
		STD	1200	0348	3487	2776	0004468	0577	14844
		STD	1300	0345	3487	2776	0004540	0623	14860
		STD	1400	0342	3487	2776	0004605	0668	14875
		STD	1500	0340	3486	2776	0004684	0715	14891
113		OBS	T1545	0339	3486	2776			14898

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4800 N	04738 W		149	87	04	21	139	1963		8501	0382	04

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		09	F04		017			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0050	3280	2638	0016592	0000	14439
142		OBS	0000	-0050	3280	2638			14439
		STD	0010	-0057	3291	2647	0015718	0016	14439
		STD	0020	-0065	3306	2659	0014537	0031	14439
142		OBS	0023	-0067	3311	2663			14440
		STD	0030	-0015	3330	2676	0012899	0045	14467
142		OBS	0047	0063	3366	2701			14511
		STD	0050	0063	3370	2705	0010238	0068	14512
142		OBS	0070	0064	3390	2721			14518
		STD	0075	0073	3393	2722	0008546	0092	14524
142		OBS	0094	0114	3406	2730			14547
		STD	0100	0137	3412	2734	0007513	0112	14559
		STD	0125	0214	3434	2745	0006423	0129	14600
142		OBS	0140	0244	3442	2749			14617
		STD	0150	0248	3443	2750	0006032	0145	14621
142		OBS	T0187	0265	3448	2752			14635
		STD	0200	0274	3450	2753	0005758	0174	14641
		STD	0250	0303	3457	2756	0005528	0202	14663
142		OBS	0293	0318	3462	2759			14677
		STD	0300	0320	3463	2759	0005275	0229	14679
142		OBS	T0378	0321	3472	2766			14694

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4748 N	04749 W		149	77	04	21	160	1963		8502	0295	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		11	F05		020			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0086	3276	2636	0016774	0000	14422
163		OBS	0000	-0086	3276	2636			14422
		STD	0010	-0099	3278	2638	0016574	0017	14418
		STD	0020	-0113	3281	2641	0016296	0033	14413
163		OBS	0025	-0120	3283	2642			14411
		STD	0030	-0137	3285	2644	0015916	0049	14404
163		OBS	0049	-0160	3298	2656			14398
		STD	0050	-0159	3299	2656	0014771	0080	14399
163		OBS	0074	-0092	3322	2673			14438
		STD	0075	-0084	3324	2674	0013063	0115	14442
163		OBS	0099	0053	3356	2694			14513
		STD	0100	0053	3357	2695	0011167	0145	14514
		STD	0125	0048	3374	2709	0009847	0171	14518
163		OBS	0148	0044	3390	2722			14522
		STD	0150	0053	3392	2723	0008505	0194	14527
163		OBS	0198	0221	3426	2738			14614
		STD	0200	0223	3427	2739	0007054	0233	14615
		STD	0250	0260	3447	2752	0005895	0265	14643
163		OBS	T0272	0277	3450	2753			14654

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4745 N	04813 W		149	78	04	21	178	1963		8503	0250	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		11	F03		012			

MESSENGER TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0085	3272	2632	0017084	0000	14422
181		OBS	0000	-0085	3272	2632			14422
		STD	0010	-0086	3274	2634	0016953	0017	14423
		STD	0020	-0087	3275	2635	0016822	0034	14425
181		OBS	0025	-0087	3276	2636			14426
		STD	0030	-0110	3279	2639	0016451	0051	14416
		STD	0050	-0170	3290	2649	0015437	0082	14393
181		OBS	0050	-0170	3290	2649			14393
		STD	0075	-0170	3300	2657	0014649	0120	14398
181		OBS	0075	-0170	3300	2657			14398
		STD	0100	-0135	3316	2669	0013495	0155	14421
181		OBS	0100	-0135	3316	2669			14421
		STD	0125	-0040	3346	2690	0011537	0187	14474
		STD	0150	0040	3371	2707	0010027	0213	14518
181		OBS	0150	0040	3371	2707			14518
		STD	0200	0152	3406	2728	0008097	0259	14581
181		OBS	0200	0152	3406	2728			14581

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47395N	04832 W		149	78	04	21	199	1963		8504	0200	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F03		010			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	−0082	3280	2639	0016480	0000	14424
203	OBS	0000	−0082	3280	2639			14424
	STD	0010	−0086	3281	2640	0016394	0016	14425
	STD	0020	−0089	3282	2640	0016316	0033	14425
203	OBS	0023	−0090	3282	2641			14425
	STD	0030	−0121	3286	2645	0015883	0049	14412
203	OBS	0046	−0160	3294	2652			14397
	STD	0050	−0156	3296	2654	0015009	0080	14400
203	OBS	0068	−0144	3304	2660			14410
	STD	0075	−0142	3306	2662	0014260	0116	14412
203	OBS	0091	−0137	3316	2670			14419
	STD	0100	−0068	3332	2680	0012500	0150	14455
	STD	0125	0071	3368	2702	0010434	0178	14528
203	OBS	0137	0109	3380	2710			14548
	STD	0150	0130	3389	2716	0009218	0203	14561
203	OBS	T0160	0132	3394	2719			14564

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4740 N	04858 W		149	78	04	21	220	1963		8505	0168	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		11	F04		005			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	−0062	3288	2644	0015936	0000	14435
223	OBS	0000	−0062	3288	2644			14435
	STD	0010	−0062	3288	2644	0015929	0016	14436
	STD	0020	−0063	3288	2645	0015923	0032	14438
223	OBS	0025	−0063	3288	2645			14438
	STD	0030	−0069	3288	2645	0015865	0048	14437
223	OBS	0049	−0099	3290	2647			14426
	STD	0050	−0103	3290	2648	0015594	0079	14424
223	OBS	0074	−0157	3298	2655			14404
	STD	0075	−0157	3299	2656	0014797	0117	14404
223	OBS	0099	−0148	3310	2665			14414
	STD	0100	−0147	3311	2666	0013845	0153	14415
	STD	0125	−0096	3328	2678	0012689	0186	14445
223	OBS	T0148	−0013	3348	2691			14490

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4753 N	04850 W		149	78	04	21	237	1963		8506	0215	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		11	F04		004			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/₀₀	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0093	3272	2633	0017059	0000	14418
239	OBS	0000	-0093	3272	2633			14418
	STD	0010	-0095	3273	2633	0016986	0017	14419
	STD	0020	-0096	3274	2634	0016906	0034	14420
239	OBS	0024	-0097	3274	2634			14420
	STD	0030	-0123	3282	2642	0016184	0051	14410
239	OBS	0048	-0170	3298	2656			14393
	STD	0050	-0169	3299	2656	0014778	0081	14394
239	OBS	0073	-0162	3305	2661			14402
	STD	0075	-0156	3307	2663	0014146	0118	14406
239	OBS	0097	-0078	3330	2679			14449
	STD	0100	-0059	3334	2681	0012382	0151	14459
	STD	0125	0072	3367	2702	0010516	0179	14528
239	OBS	0146	0145	3388	2714			14567
	STD	0150	0155	3392	2716	0009165	0204	14573
239	OBS	T0194	0187	3418	2735			14598

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	48035N	04838 W		149	88	04	22	048	1963		8507	0320	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		14	F04		-003			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/₀₀	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0107	3277	2637	0016633	0000	14412
051	OBS	0000	-0107	3277	2637			14412
	STD	0010	-0108	3278	2638	0016532	0017	14414
	STD	0020	-0109	3279	2639	0016431	0033	14415
051	OBS	0025	-0109	3280	2640			14416
	STD	0030	-0080	3294	2650	0015398	0049	14432
	STD	0050	0016	3346	2688	0011818	0076	14487
051	OBS	0050	0016	3346	2688			14487
	STD	0075	0088	3396	2726	0008255	0101	14531
051	OBS	0075	0088	3398	2726			14531
	STD	0100	0106	3414	2737	0007156	0121	14546
051	OBS	0100	0106	3414	2737			14546
	STD	0125	0168	3425	2742	0006754	0138	14579
	STD	0150	0206	3434	2746	0006571	0154	14601
051	OBS	0150	0206	3434	2746			14601
	STD	0200	0212	3443	2753	0005762	0185	14613
051	OBS	0200	0212	3443	2753			14613
	STD	0250	0258	3458	2761	0005046	0212	14643
	STD	0300	0344	3478	2769	0004385	0235	14691
051	OBS	T0300	0344	3478	2769			14691

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4812 N	048375W		149	88	04	22	066	1963		8508	0605	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		14	F04		001			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0059	3284	2641	0016253	0000	14436
070	OBS	0000	-0059	3284	2641			14436
	STD	0010	-0010	3337	2682	0012392	0014	14467
	STD	0020	0036	3376	2711	0009636	0025	14495
070	OBS	0024	0053	3388	2720			14506
	STD	0030	0080	3395	2724	0008433	0034	14520
070	OBS	0048	0146	3412	2733			14555
	STD	0050	0154	3413	2733	0007541	0050	14559
070	OBS	0072	0197	3422	2737			14582
	STD	0075	0187	3422	2738	0007103	0069	14579
070	OBS	0096	0150	3422	2741			14566
	STD	0100	0163	3425	2742	0006710	0086	14573
	STD	0125	0225	3441	2750	0005982	0102	14606
070	OBS	0143	0254	3448	2753			14623
	STD	0150	0255	3449	2754	0005639	0116	14624
070	OBS	T0191	0263	3453	2756			14635
	STD	0200	0269	3455	2758	0005338	0144	14640
	STD	0250	0301	3463	2761	0005059	0170	14663
070	OBS	0286	0319	3468	2763			14677
	STD	0300	0324	3470	2765	0004789	0194	14682
070	OBS	0382	0349	3478	2768			14707
	STD	0400	0353	3480	2770	0004410	0240	14712
	STD	0500	0372	3487	2773	0004174	0283	14738
070	OBS	T0574	0378	3490	2775			14753

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4828 N	04824 W		149	88	04	22	092	1963		8509	1730	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F03		011			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0063	3350	2688	0011762	0000	14501
102		OBS	0000	0063	3350	2688			14501
		STD	0010	0083	3379	2711	0009666	0011	14516
		STD	0020	0104	3401	2727	0008119	0020	14530
102		OBS	0024	0112	3408	2732			14535
		STD	0030	0129	3412	2734	0007444	0027	14544
102		OBS	0048	0164	3424	2741			14564
		STD	0050	0165	3425	2742	0006705	0042	14565
102		OBS	0072	0171	3436	2750			14573
		STD	0075	0176	3437	2751	0005887	0057	14576
102		OBS	0096	0211					
		STD	0100	0220	3446	2756	0005401	0071	14601
		STD	0125	0270	3458	2760	0005074	0084	14628
102		OBS	0144	0301	3465	2763			14645
		STD	0150	0309	3468	2764	0004685	0097	14650
102		OBS	T0192	0350	3482	2772			14677
		STD	0200	0353	3482	2771	0004068	0119	14679
		STD	0250	0366	3484	2772	0004084	0139	14693
102		OBS	0289	0372	3486	2773			14703
		STD	0300	0372	3486	2773	0004056	0159	14704
102		OBS	0384	0373	3488	2774			14719
		STD	0400	0372	3488	2774	0004010	0200	14721
		STD	0500	0369	3486	2774	0004067	0240	14736
102		OBS	T0577	0366	3486	2775			14748
		STD	0600	0366	3488	2775	0004108	0281	14752
		STD	0700	0363	3489	2776	0004079	0322	14767
102		OBS	0772	0361	3490	2777			14778
		STD	0800	0359	3490	2777	0004068	0363	14782
		STD	0900	0355	3490	2777	0004106	0403	14797
102		OBS	T0969	0352	3490	2778			14807
		STD	1000	0352	3490	2778	0004143	0445	14813
		STD	1100	0351	3491	2778	0004184	0486	14829
		STD	1200	0350	3491	2779	0004223	0528	14845
		STD	1300	0349	3491	2779	0004262	0571	14862
		STD	1400	0348	3492	2779	0004299	0614	14878
102		OBS	T1474	0347	3492	2780			14890

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48535N	04818 W		149	88	04	22	131	1963		8510	2270	14

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		14	F03		031			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0351	3448	2744	0006461	0000	14641
138		OBS	0000	0351	3448	2744			14641
		STD	0010	0357	3449	2745	0006445	0006	14645
		STD	0020	0362	3450	2745	0006430	0013	14649
138		OBS	0020	0362	3450	2745			14649
		STD	0030	0306	3447	2748	0006153	0019	14626
138		OBS	0040	0269	3446	2750			14612
		STD	0050	0264	3447	2752	0005807	0031	14612
138		OBS	0060	0254	3446	2753			14609
		STD	0075	0222	3449	2757	0005328	0045	14598
138		OBS	0080	0218	3450	2758			14597
		STD	0100	0275	3462	2763	0004799	0058	14627
138		OBS	0120	0318	3472	2767			14650
		STD	0125	0325	3474	2768	0004362	0069	14654
		STD	0150	0353	3482	2771	0004047	0080	14671
138		OBS	T0160	0362	3484	2772			14677
		STD	0200	0368	3486	2773	0003939	0100	14686
138		OBS	0247	0374	3488	2774			14697
		STD	0250	0374	3488	2774	0003891	0119	14697
		STD	0300	0379	3490	2775	0003862	0139	14708
138		OBS	0338	0382	3491	2775			14716
		STD	0400	0378	3491	2776	0003872	0177	14724
		STD	0500	0373	3490	2776	0003946	0216	14738
138		OBS	T0534	0371	3490	2776			14743
		STD	0600	0367	3489	2776	0004037	0256	14752
		STD	0700	0362	3486	2775	0004150	0297	14767
138		OBS	0716	0361	3488	2775			14769
		STD	0800	0356	3489	2776	0004145	0339	14781
		STD	0900	0352	3489	2777	0004146	0380	14796
138		OBS	T0900	0352	3489	2777			14796
		STD	1000	0351	3490	2778	0004145	0422	14812
		STD	1100	0350	3490	2778	0004217	0463	14829
		STD	1200	0350	3491	2779	0004213	0506	14845
		STD	1300	0349	3491	2779	0004284	0548	14862
138		OBS	T1387	0348	3492	2780			14876

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	49155N	04802 W		149	98	04	22	170	1963		8511	2370	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		14	F04		032			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0351	3448	2744	0006461	0000	14641
175		OBS	0000	0351	3448	2744			14641
		STD	0010	0345	3448	2745	0006414	0006	14640
		STD	0020	0341	3448	2745	0006385	0013	14640
175		OBS	0024	0340	3448	2745			14640
		STD	0030	0340	3448	2745	0006382	0019	14641
175		OBS	0049	0339	3448	2746			14644
		STD	0050	0336	3448	2746	0006355	0032	14643
175		OBS	0073	0277	3450	2753			14621
		STD	0075	0273	3450	2753	0005656	0047	14620
175		OBS	0098	0248	3452	2757			14613
		STD	0100	0254	3453	2757	0005300	0061	14616
		STD	0125	0312	3466	2762	0004844	0073	14647
175		OBS	0146	0344	3474	2766			14665
		STD	0150	0345	3475	2766	0004496	0085	14667
175		OBS	T0195	0359	3482	2771			14681
		STD	0200	0360	3482	2771	0004137	0107	14682
		STD	0250	0373	3485	2772	0004080	0127	14696
175		OBS	0292	0379	3488	2773			14706
		STD	0300	0379	3488	2774	0003978	0147	14708
175		OBS	0389	0380	3490	2775			14723
		STD	0400	0379	3490	2775	0003934	0187	14724
		STD	0500	0371	3487	2773	0004163	0227	14737
175		OBS	T0581	0365	3486	2773			14748
		STD	0600	0364	3487	2774	0004175	0269	14751
		STD	0700	0357	3489	2776	0004035	0310	14765
175		OBS	0778	0353	3490	2778			14776
		STD	0800	0352	3490	2778	0003989	0350	14779
		STD	0900	0350	3490	2778	0004049	0390	14795
175		OBS	T0976	0348	3490	2778			14807
		STD	1000	0348	3490	2778	0004099	0431	14811
		STD	1100	0347	3491	2779	0004144	0472	14827
		STD	1200	0347	3491	2779	0004187	0514	14844
		STD	1300	0346	3491	2779	0004230	0556	14861
		STD	1400	0346	3492	2780	0004272	0599	14877
175		OBS	T1481	0345	3492	2780			14891

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4940 N	04741 W		149	97	04	22	210	1963		8512	2670	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		11	F03		031			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0429	3454	2741	0006767	0000	14675
219	OBS	0000	0429	3454	2741			14675
	STD	0010	0429	3455	2742	0006717	0007	14676
	STD	0020	0429	3456	2742	0006675	0013	14678
219	OBS	0026	0429	3456	2743			14679
	STD	0030	0428	3456	2743	0006641	0020	14680
	STD	0050	0425	3456	2743	0006629	0033	14682
219	OBS	0052	0425	3456	2743			14682
	STD	0075	0350	3456	2751	0005911	0049	14654
219	OBS	0078	0346	3456	2751			14653
	STD	0100	0358	3463	2756	0005481	0063	14662
219	OBS	0103	0361	3464	2756			14664
	STD	0125	0407	3477	2762	0004939	0076	14689
	STD	0150	0432	3487	2767	0004476	0088	14705
219	OBS	0154	0434	3486	2768			14707
	STD	0200	0394	3487	2771	0004121	0110	14697
219	OBS	T0206	0390	3487	2771			14697
	STD	0250	0387	3487	2772	0004073	0130	14703
	STD	0300	0384	3488	2773	0004049	0150	14710
219	OBS	0310	0383	3488	2773			14711
	STD	0400	0382	3490	2774	0003990	0191	14726
219	OBS	0413	0382	3490	2775			14728
	STD	0500	0373	3490	2776	0003961	0230	14738
	STD	0600	0365	3490	2776	0003963	0270	14752
219	OBS	T0620	0364	3490	2777			14754
	STD	0700	0361	3490	2777	0004035	0310	14766
	STD	0800	0357	3489	2777	0004112	0351	14781
219	OBS	0823	0356	3489	2777			14785
	STD	0900	0353	3489	2777	0004187	0392	14796
	STD	1000	0349	3488	2776	0004260	0434	14811
219	OBS	T1026	0348	3488	2777			14815
	STD	1100	0346	3489	2777	0004268	0477	14827
	STD	1200	0343	3489	2778	0004253	0520	14842
	STD	1300	0342	3490	2779	0004268	0562	14859
	STD	1400	0340	3491	2780	0004262	0605	14875
	STD	1500	0340	3492	2780	0004281	0648	14892
219	OBS	T1541	0340	3492	2780			14899

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4950 N	04820 W		149	98	04	23	010	1963		8513	2340	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		07	F03		026			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0343	3450	2747	0006237	0000	14638
017		OBS	0000	0343	3450	2747			14638
		STD	0010	0345	3450	2747	0006259	0006	14640
		STD	0020	0346	3450	2746	0006282	0013	14642
017		OBS	0025	0347	3450	2746			14644
		STD	0030	0322	3453	2751	0005843	0019	14634
		STD	0050	0265	3462	2764	0004682	0029	14614
017		OBS	0050	0265	3462	2764			14614
		STD	0075	0294	3470	2767	0004345	0040	14632
017		OBS	0075	0294	3470	2767			14632
		STD	0100	0275	3470	2769	0004196	0051	14628
017		OBS	0100	0275	3470	2769			14628
		STD	0125	0287	3474	2771	0004017	0061	14638
017		OBS	0149	0302	3478	2773			14649
		STD	0150	0303	3478	2773	0003870	0071	14649
017		OBS	T0199	0347	3484	2773			14677
		STD	0200	0347	3484	2773	0003877	0091	14677
		STD	0250	0361	3487	2775	0003832	0110	14692
017		OBS	0297	0374	3490	2776			14705
		STD	0300	0374	3490	2776	0003791	0129	14706
017		OBS	0392	0370	3490	2776			14719
		STD	0400	0369	3490	2776	0003829	0167	14720
		STD	0500	0361	3490	2777	0003833	0205	14733
017		OBS	T0579	0356	3490	2777			14744
		STD	0600	0355	3490	2777	0003854	0244	14747
		STD	0700	0351	3490	2778	0003895	0282	14762
017		OBS	0777	0349	3490	2778			14774
		STD	0800	0349	3490	2778	0003956	0322	14778
		STD	0900	0347	3490	2778	0004015	0362	14794
017		OBS	T0979	0345	3490	2778			14806
		STD	1000	0345	3490	2778	0004073	0402	14810
		STD	1100	0342	3490	2779	0004118	0443	14825
		STD	1200	0340	3490	2779	0004173	0484	14841
		STD	1300	0338	3490	2779	0004227	0526	14857
		STD	1400	0336	3490	2779	0004279	0569	14873
017		OBS	T1484	0334	3490	2779			14886

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	5000 N	04900 W		185	09	04	23	050	1963		8514	1850	10

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		04	F04		038			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0318	3452	2751	0005860	0000	14627
057		OBS	0000	0318	3452	2751			14627
		STD	0010	0318	3452	2751	0005868	0006	14629
		STD	0020	0318	3452	2751	0005875	0012	14631
057		OBS	0026	0318	3452	2751			14632
		STD	0030	0310	3454	2753	0005692	0018	14629
		STD	0050	0271	3462	2763	0004763	0028	14617
057		OBS	0051	0269	3462	2763			14616
		STD	0075	0302	3469	2766	0004491	0040	14635
057		OBS	0077	0305	3470	2766			14637
		STD	0100	0334	3475	2768	0004351	0051	14654
057		OBS	0103	0337	3476	2768			14656
		STD	0125	0342	3478	2769	0004206	0061	14662
		STD	0150	0347	3481	2771	0004087	0072	14668
057		OBS	0153	0348	3481	2771			14669
		STD	0200	0358	3484	2772	0004012	0092	14682
057		OBS	T0205	0359	3484	2772			14683
		STD	0250	0360	3485	2773	0003985	0112	14691
		STD	0300	0361	3486	2773	0003970	0132	14700
057		OBS	0308	0361	3486	2774			14701
		STD	0400	0368	3489	2775	0003917	0171	14720
057		OBS	0411	0369	3489	2775			14722
		STD	0500	0363	3489	2776	0003958	0211	14734
		STD	0600	0358	3488	2776	0004028	0251	14748
057		OBS	T0616	0357	3488	2776			14751
		STD	0700	0353	3489	2777	0004006	0291	14763
		STD	0800	0349	3490	2778	0003971	0331	14778
057		OBS	0824	0348	3490	2778			14782
		STD	0900	0344	3490	2779	0003981	0370	14793
		STD	1000	0340	3490	2779	0004015	0410	14808
057		OBS	T1030	0338	3490	2779			14812

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4937 N	04909 W		149	99	04	23	089	1963		8515	1740	16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		04	F04		037			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0277	3444	2748	0006111	0000	14609
099		OBS	0000	0277	3444	2748			14609
		STD	0010	0264	3445	2750	0005949	0006	14605
		STD	0020	0257	3446	2751	0005844	0012	14603
099		OBS	0026	0255	3446	2752			14604
		STD	0030	0259	3448	2753	0005678	0018	14606
		STD	0050	0271	3457	2759	0005110	0028	14616
099		OBS	0052	0272	3458	2760			14617
		STD	0075	0270	3465	2765	0004517	0041	14621
099		OBS	0079	0270	3466	2766			14622
		STD	0100	0330	3474	2767	0004389	0052	14652
099		OBS	0105	0340	3476	2768			14657
		STD	0125	0353	3479	2769	0004251	0062	14666
		STD	0150	0363	3481	2769	0004220	0073	14675
099		OBS	0156	0365	3482	2770			14677
		STD	0200	0366	3485	2772	0003992	0094	14685
099		OBS	T0209	0366	3486	2773			14687
		STD	0250	0372	3487	2773	0003965	0113	14696
		STD	0300	0378	3488	2773	0004004	0133	14707
099		OBS	0314	0379	3488	2773			14710
		STD	0400	0383	3490	2774	0004000	0173	14726
099		OBS	0418	0384	3490	2774			14729
		STD	0500	0376	3490	2775	0003993	0213	14740
		STD	0600	0367	3490	2776	0003984	0253	14752
099		OBS	T0627	0365	3490	2776			14756
		STD	0700	0360	3490	2777	0004016	0293	14766
		STD	0800	0354	3489	2777	0004071	0334	14780
099		OBS	0831	0352	3489	2777			14784
		STD	0900	0348	3489	2777	0004123	0375	14794
		STD	1000	0344	3488	2777	0004195	0416	14809
099		OBS	T1032	0343	3488	2777			14814
		STD	1100	0343	3489	2778	0004218	0458	14825
		STD	1200	0343	3490	2779	0004216	0500	14842
		STD	1300	0343	3491	2779	0004207	0543	14859
		STD	1400	0343	3492	2780	0004197	0585	14876
		STD	1500	0343	3493	2781	0004194	0627	14893
099		OBS	T1551	0343	3494	2782			14902

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4913 N	04915 W		149	99	04	23	125	1963		8516	1680	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F05		044			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0200	3406	2724	0008382	0000	14570
132	OBS	0000	0200	3406	2724			14570
	STD	0010	0163	3405	2726	0008236	0008	14555
	STD	0020	0139	3403	2726	0008198	0017	14546
132	OBS	0026	0131	3402	2726			14543
	STD	0030	0132	3408	2731	0007767	0025	14545
	STD	0050	0151	3432	2749	0006080	0038	14560
132	OBS	0052	0154	3434	2750			14562
	STD	0075	0209	3446	2755	0005454	0053	14592
132	OBS	0078	0213	3447	2756			14594
	STD	0100	0213	3449	2757	0005270	0066	14598
132	OBS	0104	0213	3450	2758			14599
	STD	0125	0237	3457	2762	0004871	0079	14614
	STD	0150	0267	3465	2766	0004536	0091	14632
132	OBS	0155	0273	3466	2766			14635
	STD	0200	0333	3477	2769	0004272	0113	14670
132	OBS	T0207	0340	3478	2769			14674
	STD	0250	0355	3482	2771	0004131	0134	14688
	STD	0300	0368	3487	2774	0003939	0154	14703
132	OBS	0308	0370	3488	2774			14705
	STD	0400	0378	3490	2775	0003926	0193	14724
132	OBS	0406	0378	3490	2775			14725
	STD	0500	0372	3490	2776	0003950	0233	14738
132	OBS	T0596	0367	3490	2776			14752
	STD	0600	0367	3490	2776	0003984	0272	14752
	STD	0700	0362	3490	2777	0004016	0312	14767
132	OBS	0784	0358	3490	2777			14779
	STD	0800	0357	3490	2777	0004045	0352	14781
	STD	0900	0352	3490	2778	0004050	0393	14796
132	OBS	T0994	0348					
	STD	1000	0348	3491	2779	0004064	0434	14811
	STD	1100	0347	3491	2779	0004115	0474	14828
	STD	1200	0347	3491	2779	0004173	0516	14844
	STD	1300	0346	3491	2779	0004224	0558	14861
	STD	1400	0346	3492	2780	0004273	0600	14877
	STD	1500	0345	3492	2780	0004323	0643	14894
132	OBS	T1508	0345	3492	2780			14895

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4848 N	049275W		149	89	04	23	158	1963		8517	1420	14

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		04	F03		030			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0177	3392	2715	0009279	0000	14558
164		OBS	0000	0177	3392	2715			14558
		STD	0010	0160	3403	2725	0008329	0009	14553
		STD	0020	0147	3412	2733	0007561	0017	14550
164		OBS	0026	0141	3416	2736			14549
		STD	0030	0140	3417	2737	0007136	0024	14550
		STD	0050	0134	3425	2744	0006497	0038	14552
164		OBS	0051	0134	3426	2745			14552
		STD	0075	0241	3445	2752	0005783	0053	14605
164		OBS	0077	0244	3446	2753			14607
		STD	0100	0201	3446	2756	0005403	0067	14592
164		OBS	0102	0200	3446	2756			14592
		STD	0125	0262	3458	2761	0005005	0080	14625
		STD	0150	0311	3467	2763	0004778	0092	14651
164		OBS	0153	0315	3468	2764			14653
		STD	0200	0345	3475	2766	0004538	0116	14675
164		OBS	T0204	0347	3476	2767			14677
		STD	0250	0355	3479	2768	0004401	0138	14688
		STD	0300	0361	3482	2770	0004287	0160	14699
164		OBS	0307	0362	3482	2770			14701
		STD	0400	0367	3484	2771	0004267	0202	14718
164		OBS	0408	0367	3484	2771			14720
		STD	0500	0371	3486	2772	0004254	0245	14737
		STD	0600	0376	3488	2774	0004241	0288	14756
164		OBS	T0611	0376	3488	2774			14758
		STD	0700	0375	3489	2775	0004240	0330	14772
		STD	0800	0373	3490	2776	0004237	0372	14788
164		OBS	0814	0373	3490	2776			14790
		STD	0900	0370	3490	2776	0004279	0415	14804
		STD	1000	0366	3490	2776	0004318	0458	14819
164		OBS	T1016	0365	3490	2776			14821
		STD	1100	0361	3490	2777	0004343	0501	14833
		STD	1200	0356	3490	2777	0004366	0545	14848
		STD	1300	0351	3490	2778	0004385	0588	14862
164		OBS	T1353	0348	3490	2778			14870

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48335N	04935 W		149	89	04	23	184	1963		8518	0622	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		02	F04		021			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0003	3292	2645	0015891	0000	14465
188		OBS	0000	0003	3292	2645			14465
		STD	0010	-0003	3303	2654	0015021	0015	14466
		STD	0020	-0009	3316	2665	0013999	0030	14467
188		OBS	0024	-0011	3322	2670			14467
		STD	0030	-0006	3334	2679	0012635	0043	14472
188		OBS	0048	0010	3362	2701			14486
		STD	0050	0023	3364	2702	0010481	0066	14493
188		OBS	0072	0134	3386	2713			14550
		STD	0075	0142	3389	2715	0009285	0091	14554
188		OBS	0096	0181	3406	2726			14577
		STD	0100	0181	3408	2727	0008128	0113	14578
		STD	0125	0182	3421	2738	0007157	0132	14584
188		OBS	0146	0182	3430	2745			14589
		STD	0150	0186	3431	2745	0006443	0149	14592
188		OBS	T0194	0229	3446	2754			14620
		STD	0200	0237	3448	2755	0005591	0179	14625
		STD	0250	0297	3465	2763	0004871	0205	14661
188		OBS	0291	0332	3474	2767			14684
		STD	0300	0336	3475	2767	0004531	0229	14688
188		OBS	0389	0363	3480	2769			14714
		STD	0400	0364	3481	2769	0004445	0274	14717
		STD	0500	0369	3484	2771	0004369	0318	14736
188		OBS	T0584	0374	3486	2772			14752

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4816 N	04940 W		149	89	04	23	206	1963		8519	0225	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		02	F04		016			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0072	3269	2630	0017357	0000	14428
209		OBS	0000	-0072	3269	2630			14428
		STD	0010	-0105	3273	2634	0016939	0017	14414
		STD	0020	-0131	3278	2639	0016476	0034	14404
209		OBS	0025	-0141	3282	2642			14401
		STD	0030	-0153	3288	2647	0015646	0050	14397
		STD	0050	-0163	3308	2664	0014071	0080	14398
209		OBS	0050	-0163	3308	2664			14398
		STD	0075	-0090	3324	2675	0013042	0114	14439
209		OBS	0075	-0090	3324	2675			14439
		STD	0100	0033	3349	2689	0011668	0144	14504
209		OBS	0100	0033	3349	2689			14504
		STD	0125	0103	3372	2704	0010327	0172	14543
209		OBS	0149	0154	3392	2716			14572
		STD	0150	0156	3393	2717	0009096	0196	14573
209		OBS	T0199	0208	3430	2743			14609

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4805 N	04948 W		149	89	04	23	225	1963		8520	0166	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		02	F06		013			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0072	3271	2631	0017203	0000	14428
227		OBS	0000	-0072	3271	2631			14428
		STD	0010	-0072	3271	2631	0017227	0017	14429
		STD	0020	-0073	3270	2630	0017258	0034	14431
227		OBS	0023	-0073	3270	2630			14431
		STD	0030	-0112	3281	2641	0016292	0051	14415
227		OBS	0047	-0169	3299	2657			14394
		STD	0050	-0168	3300	2657	0014681	0082	14395
227		OBS	0070	-0162	3306	2662			14402
		STD	0075	-0124	3314	2668	0013697	0118	14422
227		OBS	0093	-0012	3338	2683			14480
		STD	0100	0020	3346	2688	0011829	0150	14497
		STD	0125	0086	3367	2701	0010600	0178	14534
227		OBS	T0140	0088	3374	2706			14539

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4746 N	04948 W		149	79	04	24	002	1963		8521	0100	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		02	F05		014			

MESSENGER TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0052	3287	2643	0016049	0000	14439
006		OBS	0000	-0052	3287	2643			14439
		STD	0010	-0052	3288	2644	0016006	0016	14441
		STD	0020	-0052	3288	2644	0015963	0032	14443
006		OBS	0020	-0052	3288	2644			14443
		STD	0030	-0053	3288	2644	0015954	0048	14444
006		OBS	0041	-0054	3288	2644			14445
		STD	0050	-0072	3290	2646	0015721	0080	14439
006		OBS	0062	-0094	3296	2652			14431
		STD	0075	-0116	3308	2662	0014182	0117	14425
006		OBS	T0082	-0127	3316	2669			14422

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4723 N	04957 W		149	79	04	24	030	1963		8522	0083	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F07		009			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0018	3297	2650	0015418	0000	14456
033		OBS	0000	-0018	3297	2650			14456
		STD	0010	-0018	3297	2650	0015383	0015	14458
		STD	0020	-0018	3298	2651	0015349	0031	14460
033		OBS	0026	-0018	3298	2651			14461
		STD	0030	-0024	3298	2651	0015282	0046	14459
		STD	0050	-0050	3300	2654	0015054	0076	14450
033		OBS	0053	-0054	3300	2654			14449
033		OBS	T0074	-0076	3304	2658			14443

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4735 N	050235W		150	70	04	24	060	1963		8523	0145	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F06		003			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0058	3287	2644	0016027	0000	14437
063	OBS	0000	-0058	3287	2644			14437
	STD	0010	-0058	3287	2644	0015991	0016	14438
	STD	0020	-0058	3288	2644	0015956	0032	14440
063	OBS	0025	-0058	3288	2644			14441
	STD	0030	-0058	3288	2644	0015934	0048	14441
	STD	0050	-0060	3288	2644	0015919	0080	14444
063	OBS	0051	-0060	3288	2644			14444
	STD	0075	-0077	3319	2670	0013470	0117	14444
063	OBS	0076	-0078	3320	2671			14444
	STD	0100	-0048	3335	2682	0012351	0149	14464
063	OBS	T0102	-0043	3336	2682			14467

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4743 N	05041 W		150	70	04	24	081	1963		8524	0120	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		02	F06		003			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0070	3284	2642	0016214	0000	14431
084	OBS	0000	-0070	3284	2642			14431
	STD	0010	-0070	3284	2642	0016207	0016	14432
	STD	0020	-0071	3284	2642	0016201	0032	14433
084	OBS	0025	-0071	3284	2642			14434
	STD	0030	-0072	3284	2642	0016191	0049	14435
	STD	0050	-0083	3284	2642	0016142	0081	14433
084	OBS	0050	-0083	3284	2642			14433
	STD	0075	-0108	3308	2662	0014207	0119	14429
084	OBS	0075	-0108	3308	2662			14429
	STD	0100	-0025	3340	2685	0012069	0152	14476
084	OBS	T0100	-0025	3340	2685			14476

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4751 N	05057 W		150	70	04	24	102	1963		8525	0120	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		34	F06		008			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0084	3281	2640	0016397	0000	14424
105		OBS	0000	-0084	3281	2640			14424
		STD	0010	-0084	3281	2640	0016390	0016	14425
		STD	0020	-0085	3281	2640	0016383	0033	14427
105		OBS	0026	-0085	3281	2640			14427
		STD	0030	-0085	3281	2640	0016384	0049	14428
		STD	0050	-0085	3280	2639	0016434	0082	14431
105		OBS	0052	-0085	3280	2639			14432
		STD	0075	-0122	3289	2647	0015619	0122	14419
105		OBS	0078	-0127	3292	2650			14418
		STD	0100	-0059	3324	2673	0013147	0158	14458
105		OBS	T0104	-0037	3332	2679			14470

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4800 N	05116 W		150	81	04	24	122	1963		8526	0180	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F05		011			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0099	3283	2642	0016197	0000	14417
125		OBS	0000	-0099	3283	2642			14417
		STD	0010	-0100	3284	2643	0016088	0016	14418
		STD	0020	-0101	3286	2644	0015987	0032	14420
125		OBS	0024	-0101	3286	2644			14420
		STD	0030	-0101	3286	2644	0015943	0048	14421
125		OBS	0049	-0100	3286	2644			14425
		STD	0050	-0103	3286	2644	0015908	0080	14424
125		OBS	0074	-0151	3292	2650			14406
		STD	0075	-0150	3293	2651	0015235	0119	14407
125		OBS	0098	-0130	3312	2666			14423
		STD	0100	-0127	3314	2668	0013672	0155	14425
		STD	0125	-0069	3332	2680	0012485	0188	14458
125		OBS	T0147	0011	3346	2688			14501

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48075N	05132 W		150	81	04	24	144	1963		8527	0205	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F05		019			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0098	3278	2638	0016583	0000	14417
147		OBS	0000	-0098	3278	2638			14417
		STD	0010	-0098	3278	2637	0016609	0017	14418
		STD	0020	-0097	3277	2637	0016635	0033	14420
147		OBS	0025	-0097	3277	2637			14421
		STD	0030	-0097	3277	2637	0016629	0050	14422
		STD	0050	-0108	3278	2638	0016521	0083	14420
147		OBS	0050	-0108	3278	2638			14420
		STD	0075	-0149	3298	2655	0014854	0122	14408
147		OBS	0075	-0149	3298	2655			14408
		STD	0100	-0132	3306	2661	0014271	0159	14421
147		OBS	0100	-0132	3306	2661			14421
		STD	0125	-0094	3318	2670	0013461	0193	14445
		STD	0150	-0035	3334	2680	0012466	0226	14479
147		OBS	T0150	-0035	3334	2680			14479

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48155N	05153 W		150	81	04	24	166	1963		8528	0190	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		32	F05		015			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0105	3274	2635	0016869	0000	14413
171		OBS	0000	-0105	3274	2635			14413
		STD	0010	-0105	3273	2634	0016923	0017	14414
		STD	0020	-0106	3273	2633	0016969	0034	14416
171		OBS	0026	-0106	3272	2633			14416
		STD	0030	-0119	3277	2637	0016579	0051	14412
		STD	0050	-0165	3293	2652	0015218	0082	14395
171		OBS	0051	-0166	3294	2652			14395
		STD	0075	-0172	3298	2656	0014814	0120	14397
171		OBS	0076	-0172	3298	2656			14397
		STD	0100	-0171	3303	2660	0014397	0156	14402
171		OBS	0102	-0171	3304	2661			14403
		STD	0125	-0126	3319	2672	0013277	0191	14430
		STD	0150	-0029	3344	2688	0011731	0222	14483
171		OBS	T0153	-0014	3348	2691			14491

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4822 N	05212 W		150	82	04	24	188	1963		8529	0185	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		36	F05		006			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0091	3266	2628	0017525	0000	14418
191		OBS	0000	-0091	3266	2628			14418
		STD	0010	-0095	3268	2629	0017354	0017	14418
		STD	0020	-0098	3270	2631	0017184	0035	14419
191		OBS	0025	-0100	3271	2632			14419
		STD	0030	-0121	3277	2638	0016573	0052	14411
		STD	0050	-0173	3292	2651	0015277	0083	14391
191		OBS	0050	-0173	3292	2651			14391
		STD	0075	-0162	3296	2654	0014992	0121	14402
191		OBS	0076	-0161	3296	2654			14402
		STD	0100	-0160	3300	2657	0014670	0158	14407
191		OBS	0101	-0160	3300	2657			14407
		STD	0125	-0129	3309	2664	0014033	0194	14427
		STD	0150	-0065	3325	2674	0013024	0228	14463
191		OBS	T0151	-0062	3326	2675			14465

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48325N	05228 W		150	82	04	24	211	1963		8530	0225	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F05		-002			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0096	3273	2634	0016973	0000	14417
214		OBS	0000	-0096	3273	2634			14417
		STD	0010	-0095	3273	2634	0016938	0017	14419
		STD	0020	-0094	3274	2634	0016904	0034	14421
214		OBS	0025	-0094	3274	2634			14422
		STD	0030	-0117	3279	2639	0016431	0051	14413
		STD	0050	-0171	3293	2652	0015205	0082	14393
214		OBS	0050	-0171	3293	2652			14393
		STD	0075	-0158	3296	2654	0014985	0120	14403
214		OBS	0075	-0158	3296	2654			14403
		STD	0100	-0162	3300	2657	0014649	0157	14406
214		OBS	0100	-0162	3300	2657			14406
		STD	0125	-0121	3313	2667	0013752	0192	14431
		STD	0150	-0071	3327	2676	0012847	0226	14461
214		OBS	0150	-0071	3327	2676			14461
		STD	0200	0059	3358	2695	0011120	0286	14533
214		OBS	T0200	0059	3358	2695			14533

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48365N	05245 W		150	82	04	24	227	1963		8531	0165	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F04		-003			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0108	3280	2640	0016400	0000	14412
229		OBS	0000	-0108	3280	2640			14412
		STD	0010	-0108	3281	2640	0016331	0016	14414
		STD	0020	-0109	3282	2641	0016262	0033	14415
229		OBS	0025	-0109	3282	2641			14416
		STD	0030	-0110	3282	2641	0016223	0049	14417
		STD	0050	-0112	3282	2641	0016202	0081	14419
229		OBS	0050	-0112	3282	2641			14419
		STD	0075	-0165	3292	2650	0015306	0121	14399
229		OBS	0076	-0166	3292	2651			14399
		STD	0100	-0153	3302	2658	0014551	0158	14411
229		OBS	0101	-0152	3302	2659			14411
		STD	0125	-0145	3304	2660	0014369	0194	14419
229		OBS	T0126	-0145	3304	2660			14419

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4844 N	05258 W		150	82	04	25	002	1963		8532	0097	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		36	F04		-004			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0093	3256	2620	0018286	0000	14416
005		OBS	0000	-0093	3256	2620			14416
		STD	0010	-0093	3257	2620	0018217	0018	14417
		STD	0020	-0094	3258	2621	0018148	0036	14419
005		OBS	0025	-0094	3258	2621			14420
		STD	0030	-0114	3262	2625	0017744	0054	14412
005		OBS	0049	-0164	3272	2635			14393
		STD	0050	-0165	3272	2635	0016816	0089	14392
005		OBS	T0074	-0167	3276	2638			14396

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4848 N	05245 W		150	82	04	25	015	1963		8533	0155	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		36	F04		-002			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0110	3282	2641	0016241	0000	14412
018	OBS	0000	-0110	3282	2641			14412
	STD	0010	-0110	3282	2641	0016234	0016	14413
	STD	0020	-0110	3282	2641	0016228	0032	14415
018	OBS	0025	-0110	3282	2641			14416
	STD	0030	-0111	3282	2641	0016220	0049	14416
	STD	0050	-0113	3282	2641	0016200	0081	14418
018	OBS	0051	-0113	3282	2641			14419
	STD	0075	-0163	3296	2654	0014942	0120	14401
018	OBS	0076	-0164	3297	2655			14401
	STD	0100	-0137	3305	2661	0014310	0157	14419
018	OBS	0102	-0135	3306	2661			14420
	STD	0125	-0126	3309	2664	0014042	0192	14428
018	OBS	T0127	-0126	3309	2664			14429

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4850 N	05240 W		150	82	04	25	024	1963		8534	0225	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		36	F04		-001			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	-0099	3274	2634	0016887	0000	14416
028	OBS	0000	-0099	3274	2634			14416
	STD	0010	-0099	3274	2634	0016881	0017	14417
	STD	0020	-0099	3274	2634	0016875	0034	14419
028	OBS	0025	-0099	3274	2634			14420
	STD	0030	-0113	3276	2637	0016673	0051	14414
	STD	0050	-0153	3286	2646	0015784	0083	14400
028	OBS	0050	-0153	3286	2646			14400
028	OBS	0074	-0171	3298	2656			14397
	STD	0075	-0171	3298	2656	0014793	0121	14397
028	OBS	0099	-0171	3300	2657			14402
	STD	0100	-0170	3300	2658	0014606	0158	14402
	STD	0125	-0153	3307	2663	0014093	0194	14415
028	OBS	0149	-0137	3314	2668			14428
	STD	0150	-0136	3314	2668	0013582	0228	14429
028	OBS	T0199	-0056	3336	2683			14477

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48555N	05224 W		150	82	04	25	044	1963		8535	0350	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F04					

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0083	3274	2634	0016937	0000	14423
047		OBS	0000	-0083	3274	2634			14423
		STD	0010	-0084	3275	2635	0016867	0017	14424
		STD	0020	-0085	3276	2635	0016798	0034	14426
047		OBS	0025	-0085	3276	2636			14427
		STD	0030	-0108	3282	2641	0016227	0050	14417
		STD	0050	-0165	3298	2656	0014834	0081	14396
047		OBS	0050	-0165	3298	2656			14396
		STD	0075	-0162	3302	2659	0014515	0118	14402
047		OBS	0075	-0162	3302	2659			14402
		STD	0100	-0145	3308	2663	0014080	0154	14415
047		OBS	0100	-0145	3308	2663			14415
		STD	0125	-0142	3318	2671	0013320	0188	14422
		STD	0150	-0121	3328	2678	0012619	0220	14438
047		OBS	0151	-0120	3328	2679			14438
		STD	0200	-0028	3351	2694	0011187	0280	14492
047		OBS	0201	-0026	3352	2695			14494
		STD	0250	0076	3381	2713	0009480	0332	14552
		STD	0300	0192	3417	2734	0007603	0374	14617
047		OBS	0301	0194	3418	2734			14618

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4901 N	05208 W		150	92	04	25	063	1963		8536	0285	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		36	F05					

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	-0064	3290	2646	0015775	0000	14434
066		OBS	0000	-0064	3290	2646			14434
		STD	0010	-0066	3290	2646	0015765	0016	14435
		STD	0020	-0067	3290	2646	0015754	0032	14436
066		OBS	0025	-0068	3290	2646			14436
		STD	0030	-0097	3294	2651	0015341	0047	14424
		STD	0050	-0172	3306	2662	0014204	0077	14394
066		OBS	0050	-0172	3306	2662			14394
		STD	0075	-0169	3313	2668	0013654	0111	14400
066		OBS	0076	-0167	3314	2669			14402
		STD	0100	-0066	3339	2686	0011973	0143	14457
066		OBS	0101	-0062	3340	2686			14459
		STD	0125	0064	3370	2704	0010241	0171	14525
		STD	0150	0144	3393	2718	0009012	0195	14568
066		OBS	0151	0146	3394	2718			14569
		STD	0200	0139	3411	2733	0007628	0237	14577
066		OBS	0202	0139	3412	2733			14577
		STD	0250	0229	3442	2751	0006001	0271	14629
066		OBS	T0252	0235	3443	2751			14632

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4905 N	05152 W		150	91	04	25	080	1963		8537	0295	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		34	F04		002			

MESSENGER TIME HR 1/10	CAST or NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10[7]	Σ Δ D DYN. M. X 10[3]	SOUND VELOCITY
		STD	0000	-0089	3281	2640	0016381	0000	14421
084		OBS	0000	-0089	3281	2640			14421
		STD	0010	-0089	3281	2639	0016406	0016	14423
		STD	0020	-0089	3280	2639	0016431	0033	14424
084		OBS	0025	-0089	3280	2639			14425
		STD	0030	-0099	3285	2643	0016025	0049	14422
		STD	0050	-0126	3302	2658	0014628	0080	14415
084		OBS	0050	-0126	3302	2658			14415
		STD	0075	-0135	3312	2666	0013819	0115	14416
084		OBS	0075	-0135	3312	2666			14416
		STD	0100	-0088	3333	2682	0012348	0148	14446
084		OBS	0100	-0088	3333	2682			14446
		STD	0125	0026	3362	2700	0010638	0177	14506
		STD	0150	0109	3385	2714	0009382	0202	14551
084		OBS	0151	0112	3386	2714			14553
		STD	0200	0182	3413	2731	0007791	0245	14596
084		OBS	0201	0183	3414	2732			14596
		STD	0250	0252	3444	2750	0006047	0279	14639
084		OBS	T0276	0289	3460	2760			14661

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4913 N	05129 W		150	91	04	25	106	1963		8538	0316	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		36	F04		008			

MESSENGER TIME HR 1/10	CAST or NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10[7]	Σ Δ D DYN. M. X 10[3]	SOUND VELOCITY
		STD	0000	-0043	3300	2653	0015087	0000	14445
109		OBS	0000	-0043	3300	2653			14445
		STD	0010	-0048	3302	2655	0014909	0015	14445
		STD	0020	-0054	3303	2656	0014808	0030	14444
109		OBS	0024	-0056	3304	2657			14444
		STD	0030	-0094	3305	2659	0014508	0045	14427
109		OBS	0049	-0165	3308	2664			14397
		STD	0050	-0165	3308	2664	0014044	0073	14398
109		OBS	0073	-0152	3316	2670			14409
		STD	0075	-0147	3317	2671	0013402	0107	14411
109		OBS	0098	-0081	3336	2684			14449
		STD	0100	-0070	3339	2686	0011957	0139	14455
		STD	0125	0049	3372	2707	0010003	0167	14518
109		OBS	0147	0120	3394	2720			14557
		STD	0150	0123	3396	2722	0008641	0190	14559
109		OBS	0196	0169	3422	2739			14591
		STD	0200	0173	3424	2741	0006892	0229	14593
		STD	0250	0229	3445	2753	0005775	0260	14629
109		OBS	T0284	0271	3455	2757			14654

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4923 N	05058 W		150	90	04	25	132	1963		8539	0332	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		02	F03		019			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0039	3294	2648	0015562	0000	14446
135		OBS	0000	-0039	3294	2648			14446
		STD	0010	-0035	3296	2650	0015389	0015	14450
		STD	0020	-0032	3299	2652	0015215	0031	14454
135		OBS	0025	-0030	3300	2653			14455
		STD	0030	-0056	3306	2659	0014565	0046	14445
		STD	0050	-0096	3330	2680	0012575	0073	14433
135		OBS	0050	-0096	3330	2680			14433
		STD	0075	-0001	3362	2702	0010510	0102	14486
135		OBS	0075	-0001	3362	2702			14486
		STD	0100	0092	3388	2717	0009041	0126	14536
135		OBS	0100	0092	3388	2717			14536
		STD	0125	0139	3404	2727	0008138	0148	14563
		STD	0150	0176	3418	2736	0007351	0167	14586
135		OBS	0150	0176	3418	2736			14586
		STD	0200	0223	3438	2748	0006259	0201	14617
135		OBS	0201	0224	3438	2748			14618
		STD	0250	0269	3453	2756	0005519	0230	14648
		STD	0300	0314	3464	2761	0005142	0257	14677
135		OBS	T0302	0316	3464	2760			14678

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4934 N	05030 W		150	90	04	25	160	1963		8540	0332	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		04	F03		026			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	-0021	3302	2654	0015023	0000	14456
163		OBS	0000	-0021	3302	2654			14456
		STD	0010	-0021	3303	2655	0014943	0015	14458
		STD	0020	-0022	3305	2657	0014782	0030	14459
163		OBS	0025	-0023	3306	2657			14460
		STD	0030	-0025	3307	2658	0014598	0045	14460
		STD	0050	-0032	3312	2663	0014194	0073	14460
163		OBS	0050	-0032	3312	2663			14460
163		OBS	0074	-0086	3339	2687			14443
		STD	0075	-0083	3340	2687	0011843	0106	14445
163		OBS	0099	-0002	3372	2710			14491
		STD	0100	0003	3373	2710	0009686	0133	14493
		STD	0125	0101	3398	2725	0008341	0155	14545
163		OBS	0148	0164	3415	2734			14579
		STD	0150	0166	3416	2735	0007428	0175	14581
163		OBS	0198	0207	3432	2744			14609
		STD	0200	0209	3433	2745	0006492	0210	14610
		STD	0250	0251	3448	2754	0005737	0240	14639
163		OBS	T0297	0289	3460	2760			14665

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4941 N	05000 W		150	90	04	25	186	1963		8541	0635	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		04	F03		035			

MESSENGER or CAST TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0038	3366	2703	0010411	0000	14492
192		OBS	0000	0038	3366	2703			14492
		STD	0010	0040	3367	2704	0010315	0010	14495
		STD	0020	0043	3369	2705	0010227	0021	14497
192		OBS	0022	0043	3369	2705			14498
		STD	0030	0088	3381	2712	0009544	0031	14521
192		OBS	0045	0151	3396	2720			14554
		STD	0050	0172	3399	2721	0008728	0049	14565
192		OBS	0067	0194	3404	2723			14578
		STD	0075	0154	3404	2726	0008230	0070	14562
192		OBS	0090	0107	3404	2729			14543
		STD	0100	0125	3410	2733	0007584	0090	14554
		STD	0125	0166	3423	2740	0006891	0108	14578
192		OBS	0134	0179	3428	2743			14586
		STD	0150	0199	3436	2748	0006165	0124	14598
192		OBS	0172	0223	3446	2754			14614
		STD	0200	0241	3451	2757	0005398	0153	14627
		STD	0250	0270	3460	2761	0005002	0179	14649
192		OBS	0274	0283	3463	2763			14659
		STD	0300	0296	3466	2764	0004822	0204	14669
192		OBS	0375	0327	3474	2767			14696
		STD	0400	0336	3476	2768	0004536	0250	14704
		STD	0500	0364	3484	2772	0004312	0295	14734
192		OBS	T0582	0377	3488	2774			14753

731-298 O—64——14

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4951 N	049305W		149	99	04	25	218	1963		8542	1390	14

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F03		038			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0304	3448	2749	0006039	0000	14621
223	OBS	0000	0304	3448	2749			14621
	STD	0010	0306	3449	2750	0005970	0006	14623
	STD	0020	0307	3450	2750	0005900	0012	14626
223	OBS	0025	0308	3451	2751			14627
	STD	0030	0308	3451	2751	0005852	0018	14628
	STD	0050	0307	3452	2752	0005808	0029	14631
223	OBS	0052	0307	3452	2752			14631
	STD	0075	0313	3459	2757	0005309	0043	14638
223	OBS	0077	0313	3460	2758			14639
	STD	0100	0299	3462	2760	0005025	0056	14637
223	OBS	0103	0298	3462	2761			14637
	STD	0125	0297	3465	2763	0004785	0069	14641
	STD	0150	0296	3469	2766	0004531	0080	14645
223	OBS	0154	0296	3469	2766			14646
	STD	0200	0316	3474	2768	0004373	0102	14662
223	OBS	T0205	0318	3474	2768			14664
	STD	0250	0319	3477	2770	0004207	0124	14672
	STD	0300	0328	3480	2772	0004108	0145	14685
223	OBS	0307	0330	3480	2772			14687
	STD	0400	0374	3486	2772	0004218	0186	14722
223	OBS	0408	0376	3486	2772			14724
	STD	0500	0372	3486	2773	0004252	0229	14738
	STD	0600	0368	3486	2773	0004298	0271	14752
223	OBS	T0609	0368	3486	2773			14754
	STD	0700	0365	3487	2774	0004278	0314	14768
	STD	0800	0361	3488	2775	0004250	0357	14783
223	OBS	0809	0361	3488	2775			14784
	STD	0900	0358	3489	2776	0004213	0399	14798
	STD	1000	0354	3489	2777	0004255	0442	14814
223	OBS	T1007	0354					
	STD	1100	0351	3490	2778	0004224	0484	14829
	STD	1200	0348	3490	2778	0004269	0526	14844
	STD	1300	0344	3490	2779	0004300	0569	14860
223	OBS	T1374	0342	3490	2779			14871

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	5000 N	04900 W		185	09	04	26	008	1963		8543	1830	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F01		037			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0274	3428	2736	0007295	0000	14605
014	OBS	0000	0274	3428	2736			14605
	STD	0010	0274	3430	2737	0007180	0007	14607
	STD	0020	0274	3431	2738	0007065	0014	14609
014	OBS	0025	0274	3432	2739			14610
	STD	0030	0282	3436	2741	0006776	0021	14615
	STD	0050	0305	3449	2750	0006008	0034	14630
014	OBS	0051	0306	3450	2750			14630
	STD	0075	0318	3462	2758	0005196	0048	14641
014	OBS	0076	0318	3462	2759			14641
	STD	0100	0279	3462	2762	0004834	0061	14628
014	OBS	0102	0277	3462	2762			14628
	STD	0125	0289	3468	2766	0004517	0072	14638
	STD	0150	0308	3474	2769	0004239	0083	14651
014	OBS	0151	0309	3474	2769			14651
	STD	0200	0368	3482	2770	0004262	0104	14686
014	OBS	T0202	0370	3482	2770			14687
	STD	0250	0374	3485	2771	0004137	0125	14697
	STD	0300	0379	3488	2773	0004003	0146	14707
014	OBS	0304	0379	3488	2773			14708
	STD	0400	0373	3488	2774	0004025	0186	14722
014	OBS	0406	0373	3488	2774			14723
	STD	0500	0365	3489	2775	0003987	0226	14735
	STD	0600	0359	3489	2776	0003979	0266	14749
014	OBS	T0612	0358	3489	2776			14750
	STD	0700	0357	3489	2777	0004002	0306	14765
	STD	0800	0355	3490	2777	0004033	0346	14781
014	OBS	0815	0355	3490	2777			14783
	STD	0900	0353	3490	2778	0004082	0387	14796
	STD	1000	0350	3490	2778	0004136	0428	14812
014	OBS	T1016	0350	3490	2778			14814
	STD	1100	0348	3490	2778	0004189	0469	14828
	STD	1200	0346	3490	2778	0004245	0511	14844
	STD	1300	0344	3490	2779	0004300	0554	14860
	STD	1400	0342	3490	2779	0004353	0597	14876
	STD	1500	0340	3490	2779	0004405	0641	14892
014	OBS	T1530	0340	3490	2779			14897

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4200 N	05058 W		150	20	05	14	237	1963		8544	3180	11

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		27	F03		062			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0576	3321	2619	0018343	0000	14717
011	OBS	0000	0576	3321	2619			14717
	STD	0010	0567	3327	2625	0017810	0018	14716
011	OBS	0019	0558	3332	2630			14715
	STD	0020	0564	3334	2631	0017257	0036	14718
	STD	0030	0627	3362	2645	0015916	0052	14748
011	OBS	0038	0677	3392	2662			14773
	STD	0050	0942	3462	2677	0012930	0081	14886
011	OBS	0057	1036	3488	2682			14925
	STD	0075	1065	3503	2688	0011965	0112	14940
011	OBS	0076	1067	3504	2689			14941
	STD	0100	0837	3466	2697	0011129	0141	14855
011	OBS	0113	0791	3462	2701			14839
	STD	0125	0872	3483	2705	0010442	0168	14875
	STD	0150	0973	3512	2711	0009942	0193	14920
011	OBS	T0151	0975	3513	2712			14921
	STD	0200	0826	3501	2726	0008559	0240	14872
011	OBS	0222	0755	3495	2732			14848
	STD	0250	0646	3487	2741	0007152	0279	14809
011	OBS	0289	0523	3478	2750			14764
	STD	0300	0499	3478	2752	0006100	0312	14756
	STD	0400	0355	3473	2764	0004984	0368	14712
011	OBS	T0413	0345	3472	2764			14710
	STD	0500	0364	3481	2769	0004536	0415	14733
011	OBS	0548	0371	3484	2771			14745
	STD	0600	0375	3486	2772	0004370	0460	14755
011	OBS	T0683	0380	3489	2774			14771
	STD	0700	0379	3489	2774	0004277	0503	14774
	STD	0800	0375	3490	2775	0004281	0546	14789
	STD	0900	0371	3490	2776	0004284	0589	14804
	STD	1000	0367	3491	2777	0004284	0631	14819
011	OBS	T1091	0363	3491	2777			14833

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4200 N	05158 W		150	21	05	15	059	1963		8545	3880	16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		29	F01		055			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0524	3307	2614	0018809	0000	14694
068		OBS	0000	0524	3307	2614			14694
		STD	0010	0516	3308	2616	0018646	0019	14693
		STD	0020	0509	3309	2618	0018490	0037	14692
068		OBS	0026	0504	3310	2619			14691
		STD	0030	0442	3316	2630	0017301	0055	14666
		STD	0050	0261	3346	2671	0013412	0086	14596
068		OBS	0051	0258	3348	2673			14596
		STD	0075	0344	3391	2700	0010748	0116	14642
068		OBS	0077	0356	3395	2702			14648
		STD	0100	0552	3447	2722	0008755	0140	14741
068		OBS	0102	0565	3450	2722			14747
		STD	0125	0631	3469	2729	0008113	0162	14780
		STD	0150	0669	3483	2735	0007601	0181	14801
068		OBS	0153	0671	3484	2735			14802
		STD	0200	0636	3489	2744	0006828	0217	14797
068		OBS	T0204	0633	3489	2744			14796
		STD	0250	0599	3491	2751	0006233	0250	14790
		STD	0300	0564	3494	2757	0005676	0280	14785
068		OBS	0307	0559	3494	2758			14784
		STD	0400	0501	3497	2767	0004811	0332	14776
068		OBS	0410	0496	3497	2768			14776
		STD	0500	0470	3497	2771	0004536	0379	14780
		STD	0600	0445	3497	2774	0004349	0423	14786
068		OBS	T0618	0441	3497	2774			14787
		STD	0700	0426	3496	2775	0004288	0466	14795
		STD	0800	0408	3495	2776	0004241	0509	14803
068		OBS	0825	0404	3495	2776			14806
		STD	0900	0391	3494	2777	0004208	0551	14813
		STD	1000	0376	3493	2778	0004193	0593	14823
068		OBS	T1033	0372	3493	2778			14827
		STD	1100	0370	3493	2778	0004232	0636	14837
		STD	1200	0368	3493	2779	0004285	0678	14853
		STD	1300	0365	3493	2779	0004335	0721	14869
		STD	1400	0362	3493	2779	0004384	0765	14884
		STD	1500	0359	3493	2779	0004432	0809	14900
068		OBS	T1552	0358	3493	2780			14908

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4221 N	05131 W		150	21	05	15	095	1963		8546	3170	13

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F02		074			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0513	3311	2619	0018390	0000	14690
100		OBS	0000	0513	3311	2619			14690
		STD	0010	0527	3317	2622	0018102	0018	14699
		STD	0020	0562	3328	2626	0017680	0036	14716
100		OBS	0025	0587	3336	2630			14728
		STD	0030	0647	3349	2632	0017135	0054	14755
		STD	0050	0789	3398	2651	0015396	0086	14820
100		OBS	0050	0789	3398	2651			14820
		STD	0075	0746	3459	2705	0010300	0118	14815
100		OBS	0076	0744	3460	2706			14815
		STD	0100	0771	3464	2705	0010337	0144	14830
100		OBS	0101	0772	3464	2705			14830
		STD	0125	0747	3462	2707	0010203	0170	14824
		STD	0150	0720	3459	2709	0010064	0195	14818
100		OBS	0151	0719	3459	2709			14817
		STD	0200	0746	3482	2723	0008836	0242	14839
100		OBS	T0201	0746	3482	2723			14839
		STD	0250	0732	3485	2728	0008471	0286	14842
100		OBS	0299	0650	3488	2741			14818
		STD	0300	0645	3488	2742	0007139	0325	14816
100		OBS	0396	0286	3456	2757			14679
		STD	0400	0290	3457	2757	0005508	0388	14682
		STD	0500	0366	3477	2766	0004856	0440	14734
100		OBS	T0584	0405	3488	2771			14765
		STD	0600	0407	3489	2771	0004504	0486	14769
		STD	0700	0415	3495	2775	0004248	0530	14790
100		OBS	0753	0417	3497	2777			14800
		STD	0800	0416	3497	2777	0004192	0572	14807
		STD	0900	0415	3498	2777	0004230	0614	14823
100		OBS	T0909	0415	3498	2778			14825
		STD	1000	0410	3498	2778	0004257	0657	14838
		STD	1100	0400	3497	2778	0004302	0700	14850
		STD	1200	0386	3496	2779	0004292	0743	14861
100		OBS	T1268	0375	3495	2779			14868

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	42415N	05104 W		150	21	05	15	131	1963		8547	2190	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F02		067			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0622	3323	2615	0018735	0000	14736
139		OBS	0000	0622	3323	2615			14736
		STD	0010	0621	3326	2618	0018486	0019	14738
		STD	0020	0620	3330	2621	0018228	0037	14739
139		OBS	0024	0619	3331	2622			14740
		STD	0030	0649	3347	2630	0017310	0055	14755
139		OBS	0047	0719	3388	2653			14791
		STD	0050	0725	3395	2658	0014740	0087	14795
139		OBS	0071	0776	3440	2686			14824
		STD	0075	0791	3448	2690	0011752	0120	14831
139		OBS	0095	0856	3479	2704			14863
		STD	0100	0863	3485	2708	0010112	0147	14868
		STD	0125	0899	3505	2718	0009236	0171	14888
139		OBS	0142	0924	3508	2716			14900
		STD	0150	0870	3501	2719	0009128	0194	14881
139		OBS	T0189	0656	3475	2730			14801
		STD	0200	0636	3475	2733	0007840	0237	14795
		STD	0250	0545	3475	2745	0006771	0273	14766
139		OBS	0285	0482	3475	2752			14746
		STD	0300	0446	3472	2754	0005907	0305	14733
139		OBS	0381	0308	3463	2760			14687
		STD	0400	0316	3466	2762	0005086	0360	14694
		STD	0500	0352	3478	2768	0004633	0409	14728
139		OBS	T0576	0373	3485	2772			14750
		STD	0600	0379	3486	2772	0004414	0454	14757
		STD	0700	0395	3490	2773	0004388	0498	14781
139		OBS	0768	0400	3492	2774			14794
		STD	0800	0398	3492	2774	0004383	0542	14799
		STD	0900	0390	3491	2775	0004418	0586	14812
139		OBS	T0962	0386	3491	2775			14821
		STD	1000	0384	3491	2775	0004458	0630	14826
		STD	1100	0377	3491	2776	0004462	0675	14840
		STD	1200	0372	3491	2777	0004487	0719	14855
		STD	1300	0367	3491	2777	0004510	0764	14869
		STD	1400	0363	3491	2777	0004542	0810	14884
139		OBS	T1470	0360	3491	2778			14895

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4253 N	05050 W		150	20	05	15	157	1963		8548	1000	08

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		16	F02		056			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0367	3290	2617	0018520	0000	14626
162	OBS	0000	0367	3290	2617			14626
	STD	0010	0340	3290	2620	0018286	0018	14616
	STD	0020	0306	3290	2623	0018000	0037	14603
162	OBS	0020	0306	3290	2623			14603
	STD	0030	0268	3291	2627	0017611	0054	14589
162	OBS	0039	0219	3292	2632			14569
	STD	0050	0083	3296	2644	0015982	0088	14511
162	OBS	0059	0056	3304	2652			14501
	STD	0075	0230	3332	2663	0014237	0126	14585
162	OBS	0078	0249	3336	2664			14594
	STD	0100	0150	3356	2688	0011846	0158	14557
162	OBS	0117	0106	3368	2700			14542
	STD	0125	0107	3371	2703	0010429	0186	14544
	STD	0150	0111	3382	2711	0009623	0211	14552
162	OBS	T0156	0112	3385	2714			14553
	STD	0200	0185	3410	2728	0008040	0255	14597
162	OBS	0222	0216	3421	2735			14615
	STD	0250	0244	3434	2743	0006731	0292	14634
162	OBS	0279	0276	3446	2750			14654
	STD	0300	0313	3453	2752	0005958	0324	14675
162	OBS	T0368	0398	3471	2758			14724
	STD	0400	0390	3473	2760	0005321	0380	14727
	STD	0500	0372	3480	2768	0004696	0431	14737
162	OBS	0558	0366	3483	2771			14744
	STD	0600	0369	3485	2772	0004374	0476	14752
	STD	0700	0375	3488	2774	0004308	0519	14772
162	OBS	T0784	0380	3489	2774			14788

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4256 N	05046 W		150	20	05	15	173	1963		8549	0580	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		16	F02		058			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0294	3278	2614	0018799	0000	14593
176		OBS	0000	0294	3278	2614			14593
		STD	0010	0292	3280	2616	0018658	0019	14594
		STD	0020	0263	3281	2620	0018310	0037	14584
176		OBS	0024	0244	3282	2622			14576
		STD	0030	0181	3289	2632	0017127	0055	14550
176		OBS	0048	0039	3306	2654			14492
		STD	0050	0030	3307	2656	0014861	0087	14488
176		OBS	0072	-0039	3321	2670			14462
		STD	0075	-0041	3323	2672	0013307	0122	14462
176		OBS	0096	-0042	3339	2685			14467
		STD	0100	-0036	3340	2685	0012020	0154	14471
		STD	0125	0001	3352	2693	0011272	0183	14494
176		OBS	0143	0028	3365	2702			14511
		STD	0150	0085	3374	2706	0010064	0210	14539
176		OBS	T0191	0333	3417	2721			14660
		STD	0200	0333	3420	2724	0008554	0256	14662
		STD	0250	0333	3437	2737	0007313	0296	14673
176		OBS	0287	0332	3447	2745			14680
		STD	0300	0330	3450	2748	0006347	0330	14682
176		OBS	0383	0325	3467	2762			14695
		STD	0400	0326	3470	2764	0004885	0386	14699
		STD	0500	0340	3480	2771	0004358	0432	14723
176		OBS	T0576	0363	3481	2769			14745

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4301 N	050405W		150	30	05	15	183	1963		8550	0160	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F02		052			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0318	3280	2614	0018847	0000	14604
186	OBS	0000	0318	3280	2614			14604
	STD	0010	0258	3284	2622	0018063	0018	14580
	STD	0020	0193	3290	2632	0017132	0036	14554
186	OBS	0025	0156	3294	2638			14540
	STD	0030	0103	3301	2647	0015718	0052	14517
	STD	0050	-0034	3324	2672	0013269	0081	14461
186	OBS	0050	-0034	3324	2672			14461
186	OBS	0074	-0028	3345	2689			14471
	STD	0075	-0026	3346	2690	0011615	0113	14472
186	OBS	0099	0012	3360	2699			14495
	STD	0100	0013	3360	2699	0010711	0140	14496
	STD	0125	0037	3366	2703	0010378	0167	14512
186	OBS	T0149	0044	3372	2707			14520

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4308 N	05030 W		150	30	05	15	195	1963		8551	0090	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F03		059			

MESSENGER TIME HR. 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0416	3273	2599	0020259	0000	14645
198	OBS	0000	0416	3273	2599			14645
	STD	0010	0393	3277	2604	0019776	0020	14637
	STD	0020	0368	3280	2609	0019273	0040	14629
198	OBS	0022	0362	3281	2611			14627
	STD	0030	0332	3294	2624	0017925	0058	14617
198	OBS	0045	0288	3320	2648			14604
	STD	0050	0277	3329	2656	0014827	0091	14601
198	OBS	T0067	0251	3361	2684			14597

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4320 N	05015 W		150	30	05	15	213	1963		8552	0060	00

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		16	F03		061			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0401	3246	2579	0022151	0000	14635
216		OBS	0000	0401	3246	2579			14635
		STD	0010	0393	3246	2580	0022083	0022	14633
		STD	0020	0368	3246	2582	0021861	0044	14624
216		OBS	0024	0354	3246	2584			14619
		STD	0030	0328	3250	2589	0021213	0066	14609
216		OBS	T0048	0214	3269	2614			14565

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4259 N	05015 W		150	20	05	15	235	1963		8553	0090	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		16	F03		053			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0351	3270	2603	0019887	0000	14617
238		OBS	0000	0351	3270	2603			14617
		STD	0010	0321	3271	2606	0019557	0020	14606
		STD	0020	0278	3275	2613	0018905	0039	14589
238		OBS	0027	0240	3279	2620			14574
		STD	0030	0207	3282	2624	0017840	0057	14561
		STD	0050	0050	3301	2650	0015421	0091	14496
238		OBS	0055	0028	3306	2655			14488
		STD	0075	0025	3327	2672	0013306	0126	14493
238		OBS	T0082	0024	3334	2678			14494

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4248 N	05015 W		150	20	05	16	015	1963		8554	0330	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		16	F03		047			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0230	3275	2617	0018530	0000	14565
018		OBS	0000	0230	3275	2617			14565
		STD	0010	0165	3281	2627	0017624	0018	14539
		STD	0020	0111	3287	2635	0016831	0035	14517
018		OBS	0026	0084	3290	2639			14506
		STD	0030	0072	3291	2641	0016303	0052	14502
		STD	0050	0018	3299	2650	0015412	0084	14482
018		OBS	0051	0016	3300	2651			14481
		STD	0075	-0029	3321	2670	0013510	0120	14467
018		OBS	0077	-0030	3323	2671			14467
		STD	0100	-0012	3341	2685	0012053	0152	14482
018		OBS	0102	-0010	3343	2687			14483
		STD	0125	0045	3371	2706	0010057	0179	14516
		STD	0150	0089	3393	2721	0008647	0203	14543
018		OBS	0154	0095	3396	2723			14547
		STD	0200	0131	3408	2731	0007796	0244	14572
018		OBS	0206	0134	3409	2731			14575
		STD	0250	0141	3411	2733	0007636	0282	14586
		STD	0300	0149	3414	2734	0007524	0320	14598
018		OBS	T0308	0150	3414	2734			14600

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	42385N	050165W		150	20	05	16	033	1963		8555	1800	16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		14	F03		051			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0132	3285	2632	0017109	0000	14523
037		OBS	0000	0132	3285	2632			14523
		STD	0010	0102	3285	2634	0016900	0017	14511
		STD	0020	0078	3286	2636	0016733	0034	14502
037		OBS	0026	0067	3286	2637			14498
		STD	0030	0066	3287	2637	0016606	0050	14498
		STD	0050	0048	3290	2641	0016271	0083	14494
037		OBS	0052	0045	3290	2641			14493
		STD	0075	-0007	3327	2674	0013150	0120	14478
037		OBS	0078	-0014	3333	2679			14476
		STD	0100	0077	3388	2718	0008950	0148	14529
037		OBS	0104	0091	3396	2724			14537
		STD	0125	0150	3416	2736	0007306	0168	14570
		STD	0150	0204	3433	2745	0006431	0185	14600
037		OBS	0155	0213	3436	2747			14605
		STD	0200	0256	3448	2753	0005752	0216	14633
037		OBS	T0207	0262	3450	2754			14637
		STD	0250	0289	3458	2758	0005324	0243	14657
		STD	0300	0313	3466	2762	0004983	0269	14676
037		OBS	0312	0317	3467	2763			14680
		STD	0400	0331	3473	2766	0004710	0318	14702
037		OBS	0416	0334	3474	2767			14706
		STD	0500	0358	3480	2769	0004547	0364	14731
		STD	0600	0377	3485	2771	0004466	0409	14756
037		OBS	0627	0380	3486	2772			14762
		STD	0700	0380	3488	2773	0004392	0453	14774
		STD	0800	0381	3490	2775	0004309	0497	14791
037		OBS	0840	0381	3491	2776			14798
		STD	0900	0377	3491	2776	0004309	0540	14807
		STD	1000	0372	3490	2776	0004367	0583	14821
037		OBS	T1055	0369	3490	2776			14829
		STD	1100	0367	3490	2776	0004408	0627	14836
		STD	1200	0364	3490	2777	0004441	0671	14851
		STD	1300	0361	3491	2777	0004472	0716	14867
		STD	1400	0360	3491	2777	0004527	0761	14883
		STD	1500	0360	3491	2778	0004601	0807	14900
037		OBS	T1581	0360	3491	2778			14914

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	42235N	05015 W		150	20	05	16	055	1963		8556	2470	16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F03		055			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0513	3311	2619	0018390	0000	14690
062		OBS	0000	0513	3311	2619			14690
		STD	0010	0518	3314	2621	0018217	0018	14694
		STD	0020	0522	3317	2622	0018045	0036	14698
062		OBS	0026	0525	3319	2624			14701
		STD	0030	0470	3324	2634	0016986	0054	14679
		STD	0050	0280	3350	2673	0013265	0084	14605
062		OBS	0052	0268	3353	2676			14601
		STD	0075	0246	3384	2703	0010431	0114	14599
062		OBS	0078	0243	3389	2707			14599
		STD	0100	0452	3435	2724	0008534	0138	14698
062		OBS	0104	0473	3441	2726			14708
		STD	0125	0371	3441	2737	0007312	0157	14669
		STD	0150	0294	3440	2743	0006649	0175	14640
062		OBS	0155	0284	3440	2744			14637
		STD	0200	0293	3451	2752	0005853	0206	14649
062		OBS	T0207	0295	3453	2754			14652
		STD	0250	0309	3462	2760	0005209	0234	14666
		STD	0300	0326	3470	2764	0004808	0259	14683
062		OBS	0312	0331	3472	2765			14687
		STD	0400	0371	3483	2770	0004373	0305	14720
062		OBS	0417	0377	3485	2771			14726
		STD	0500	0391	3486	2771	0004452	0349	14745
		STD	0600	0407	3487	2770	0004658	0394	14769
062		OBS	T0640	0414	3488	2770			14778
		STD	0700	0398	3489	2772	0004504	0440	14782
		STD	0800	0379	3490	2775	0004266	0484	14791
062		OBS	0843	0373	3491	2776			14795
		STD	0900	0371	3491	2777	0004217	0526	14804
		STD	1000	0367	3491	2777	0004256	0569	14819
062		OBS	T1057	0365	3491	2777			14828
		STD	1100	0364	3491	2777	0004291	0611	14834
		STD	1200	0361	3492	2778	0004316	0655	14850
		STD	1300	0359	3492	2779	0004344	0698	14866
		STD	1400	0357	3492	2779	0004372	0741	14882
		STD	1500	0356	3493	2779	0004410	0785	14898
062		OBS	T1591	0355	3493	2780			14913

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4159 N	05015 W		150	10	05	16	086	1963		8557	3310	16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		11	F03		056			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0180	3278	2623	0017950	0000	14543
093		OBS	0000	0180	3278	2623			14543
		STD	0010	0148	3279	2626	0017651	0018	14531
		STD	0020	0114	3280	2630	0017350	0035	14518
093		OBS	0025	0095	3281	2631			14510
		STD	0030	0074	3284	2635	0016848	0052	14502
		STD	0050	-0010	3313	2662	0014215	0083	14471
093		OBS	0052	-0018	3317	2666			14468
		STD	0075	0298	3387	2701	0010639	0115	14622
093		OBS	0077	0305	3390	2703			14626
		STD	0100	0113	3391	2718	0008946	0139	14546
093		OBS	0104	0093	3392	2720			14537
		STD	0125	0136	3408	2730	0007815	0160	14562
		STD	0150	0184	3424	2740	0006957	0178	14590
093		OBS	0154	0192	3426	2741			14594
		STD	0200	0275	3448	2751	0005918	0211	14641
093		OBS	T0206	0283	3450	2752			14646
		STD	0250	0295	3459	2758	0005304	0239	14660
		STD	0300	0316	3467	2763	0004937	0264	14678
093		OBS	0309	0320	3469	2764			14681
		STD	0400	0380	3483	2769	0004468	0311	14724
093		OBS	0411	0385	3484	2770			14728
		STD	0500	0386	3487	2772	0004329	0355	14743
		STD	0600	0388	3491	2774	0004177	0398	14761
093		OBS	T0616	0388	3491	2775			14764
		STD	0700	0382	3492	2776	0004106	0439	14775
		STD	0800	0376	3493	2778	0004054	0480	14790
093		OBS	0820	0375	3493	2778			14793
		STD	0900	0371	3493	2778	0004099	0521	14804
		STD	1000	0366	3492	2778	0004163	0562	14819
093		OBS	T1023	0365	3492	2778			14822
		STD	1100	0362	3492	2778	0004200	0604	14834
		STD	1200	0359	3492	2779	0004233	0646	14849
		STD	1300	0356	3493	2779	0004263	0689	14865
		STD	1400	0354	3493	2780	0004305	0731	14881
		STD	1500	0352	3493	2780	0004345	0775	14897
093		OBS	T1555	0352	3493	2780			14906

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4129 N	05015 W		150	10	05	16	125	1963		8558	4200	12

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F04		170			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	1249	3505	2655	0014924	0000	14992
132	OBS	0000	1249	3505	2655			14992
	STD	0010	1231	3502	2656	0014829	0015	14987
	STD	0020	1214	3499	2658	0014744	0030	14983
132	OBS	0021	1212	3499	2658			14982
	STD	0030	1280	3524	2664	0014192	0044	15010
132	OBS	0042	1337	3547	2670			15034
	STD	0050	1339	3554	2675	0013176	0071	15036
132	OBS	0063	1341	3556	2676			15040
	STD	0075	1262	3539	2679	0012870	0104	15013
132	OBS	0084	1225	3532	2681			15001
	STD	0100	1267	3542	2680	0012819	0136	15019
	STD	0125	1301	3557	2685	0012404	0168	15037
132	OBS	0126	1302	3558	2686			15037
	STD	0150	1292	3556	2686	0012400	0199	15038
132	OBS	T0168	1275	3554	2688			15035
	STD	0200	1221	3551	2696	0011547	0259	15021
132	OBS	0249	1107	3540	2709			14988
	STD	0250	1104	3540	2710	0010341	0313	14987
	STD	0300	0936	3518	2722	0009216	0362	14932
132	OBS	0326	0854	3509	2728			14904
	STD	0400	0598	3487	2747	0006741	0442	14814
132	OBS	T0474	0443	3478	2759			14762
	STD	0500	0444	3483	2763	0005270	0502	14767
	STD	0600	0446	3496	2773	0004439	0551	14786
132	OBS	0627	0447	3498	2774			14791
	STD	0700	0445	3499	2775	0004307	0594	14803
132	OBS	T0779	0441	3500	2776			14814
	STD	0800	0439	3500	2777	0004264	0637	14817
	STD	0900	0429	3500	2778	0004244	0680	14829
	STD	1000	0413	3499	2779	0004220	0722	14839
	STD	1100	0393	3496	2778	0004289	0765	14847
	STD	1200	0369	3493	2778	0004303	0808	14854
132	OBS	T1202	0368	3493	2779			14853

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4100 N	05015 W		150	10	05	16	166	1963		8559	4260	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F04		164			

MESSENGER TIME HR 1/10 or CAST NO.		CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1571	3599	2659	0014533	0000	15108
170		OBS	0000	1571	3599	2659			15108
		STD	0010	1571	3600	2660	0014506	0015	15110
		STD	0020	1569	3601	2661	0014429	0029	15111
170		OBS	0024	1568	3601	2661			15112
		STD	0030	1564	3601	2662	0014367	0043	15111
170		OBS	0048	1552	3599	2664			15110
		STD	0050	1540	3597	2665	0014169	0072	15107
170		OBS	0072	1433	3580	2675			15074
		STD	0075	1424	3578	2676	0013204	0106	15072
170		OBS	0095	1368	3568	2680			15055
		STD	0100	1355	3566	2681	0012764	0139	15052
		STD	0125	1303	3556	2684	0012545	0170	15037
170		OBS	0142	1282	3553	2686			15033
		STD	0150	1285	3554	2686	0012412	0201	15035
170		OBS	T0190	1286	3557	2688			15042
		STD	0200	1285	3557	2688	0012327	0263	15044
		STD	0250	1252	3555	2693	0011972	0324	15040
170		OBS	0282	1206	3551	2699			15029
		STD	0300	1158	3545	2704	0011071	0382	15015
170		OBS	0371	0978	3526	2721			14960
		STD	0400	0891	3516	2729	0008694	0460	14932
		STD	0500	0662	3498	2748	0006929	0559	14857
170		OBS	0542	0598	3494	2753			14838
		STD	0600	0591	3498	2757	0006079	0624	14846
		STD	0700	0562	3506	2767	0005273	0680	14852
170		OBS	0728	0550	3508	2770			14852
		STD	0800	0496	3503	2772	0004753	0731	14841
		STD	0900	0435	3497	2775	0004540	0777	14832
170		OBS	T0916	0427	3496	2775			14831
		STD	1000	0421	3496	2775	0004555	0822	14842
		STD	1100	0414	3496	2776	0004577	0868	14856
		STD	1200	0407	3495	2776	0004595	0914	14870
		STD	1300	0399	3495	2777	0004610	0960	14883
		STD	1400	0392	3495	2778	0004622	1006	14897
170		OBS	T1402	0392	3495	2778			14897

731–298 O—64——15

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4200 N	04927 W		149	29	05	16	233	1963		8560	3290	10

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		11	F04		063			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0370	3273	2603	0019830	0000	14625
240		OBS	0000	0370	3273	2603			14625
		STD	0010	0324	3276	2610	0019205	0020	14608
240		OBS	0018	0261	3280	2619			14582
		STD	0020	0228	3282	2623	0017990	0038	14568
		STD	0030	0093	3291	2639	0016421	0055	14511
240		OBS	0036	0034	3298	2648			14486
		STD	0050	-0035	3319	2668	0013647	0085	14460
240		OBS	0054	-0041	3325	2673			14459
240		OBS	0072	0005	3354	2695			14487
		STD	0075	0077	3364	2699	0010774	0116	14521
		STD	0100	0488	3427	2713	0009523	0141	14712
240		OBS	0107	0541	3437	2715			14736
		STD	0125	0450	3436	2725	0008464	0164	14701
240		OBS	T0143	0388	3435	2730			14678
		STD	0150	0400	3441	2734	0007593	0184	14685
		STD	0200	0464	3472	2752	0005999	0218	14724
240		OBS	0224	0482	3482	2757			14737
		STD	0250	0483	3484	2759	0005568	0246	14742
		STD	0300	0484	3488	2762	0005140	0273	14751
240		OBS	0309	0484	3489	2763			14753
		STD	0400	0474	3495	2769	0004619	0321	14765
		STD	0500	0459	3499	2774	0004258	0366	14775
240		OBS	T0500	0459	3499	2774			14775
		STD	0600	0440	3499	2776	0004142	0408	14784
240		OBS	0640	0432	3499	2777			14787
		STD	0700	0418	3497	2776	0004135	0449	14791
240		OBS	T0766	0404	3496	2777			14796
		STD	0800	0398	3495	2777	0004145	0490	14799
		STD	0900	0382	3494	2778	0004124	0532	14809
		STD	1000	0370	3492	2778	0004218	0574	14820
240		OBS	T1050	0366	3492	2778			14827

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4124 N	04855 W		149	18	05	17	051	1963		8561	3320	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F03		116			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1146	3460	2640	0016368	0000	14951
057		OBS	0000	1146	3460	2640			14951
		STD	0010	1165	3467	2642	0016213	0016	14960
		STD	0020	1200	3481	2646	0015838	0032	14976
057		OBS	0026	1228	3492	2649			14988
		STD	0030	1274	3509	2653	0015179	0048	15006
		STD	0050	1416	3565	2667	0013918	0077	15063
057		OBS	0053	1424	3569	2669			15067
		STD	0075	1363	3566	2679	0012852	0110	15050
057		OBS	0079	1356	3565	2680			15048
		STD	0100	1342	3562	2680	0012800	0142	15047
057		OBS	0106	1338	3561	2681			15046
		STD	0125	1324	3560	2683	0012662	0174	15045
		STD	0150	1299	3558	2686	0012390	0206	15040
057		OBS	0158	1289	3557	2687			15038
		STD	0200	1230	3551	2694	0011716	0266	15024
057		OBS	T0211	1207	3549	2697			15018
		STD	0250	1045	3529	2712	0010118	0320	14965
		STD	0300	0881	3511	2725	0008854	0368	14911
057		OBS	0314	0844	3508	2729			14899
		STD	0400	0710	3506	2747	0006853	0446	14861
057		OBS	0415	0687	3505	2750			14854
		STD	0500	0529	3497	2764	0005231	0507	14804
		STD	0600	0414	3488	2770	0004644	0556	14772
057		OBS	T0613	0404	3487	2770			14770
		STD	0700	0411	3491	2772	0004509	0602	14788
		STD	0800	0420	3495	2775	0004380	0646	14808
057		OBS	0816	0421	3496	2775			14812
		STD	0900	0414	3496	2776	0004357	0690	14823
		STD	1000	0405	3496	2777	0004343	0734	14836
057		OBS	T1016	0404	3496	2777			14838
		STD	1100	0398	3496	2778	0004336	0777	14849
		STD	1200	0391	3496	2779	0004325	0820	14863
		STD	1300	0385	3497	2780	0004331	0864	14877
		STD	1400	0379	3497	2780	0004328	0907	14892
		STD	1500	0374	3497	2781	0004334	0950	14907
057		OBS	T1533	0373	3497	2781			14912

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4101 N	04830 W		149	18	05	17	089	1963		8562	2990	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F02		087			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/₀₀	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0594	3309	2607	0019450	0000	14723
095		OBS	0000	0594	3309	2607			14723
		STD	0010	0570	3320	2619	0018396	0019	14716
		STD	0020	0546	3330	2630	0017354	0037	14710
095		OBS	0022	0541	3332	2632			14708
		STD	0030	0832	3416	2659	0014638	0055	14835
095		OBS	0045	1179	3518	2679			14977
		STD	0050	1189	3522	2680	0012698	0080	14982
095		OBS	0067	1216	3533	2683			14995
		STD	0075	1226	3536	2684	0012415	0112	15000
095		OBS	0090	1233	3539	2685			15006
		STD	0100	1219	3538	2686	0012227	0142	15002
		STD	0125	1183	3534	2691	0011881	0172	14994
095		OBS	0134	1170	3533	2692			14990
		STD	0150	1015	3504	2698	0011225	0201	14934
095		OBS	T0179	0796	3467	2704			14853
		STD	0200	0749	3472	2715	0009590	0253	14839
		STD	0250	0660	3481	2734	0007783	0297	14813
095		OBS	0275	0628	3485	2742			14805
		STD	0300	0618	3488	2746	0006785	0333	14806
095		OBS	0375	0585	3496	2756			14806
		STD	0400	0565	3496	2759	0005650	0395	14802
		STD	0500	0500	3496	2766	0004970	0449	14792
095		OBS	T0588	0461	3496	2771			14790
		STD	0600	0459	3496	2771	0004575	0496	14792
		STD	0700	0444	3498	2774	0004391	0541	14802
095		OBS	0784	0433	3499	2776			14812
		STD	0800	0432	3499	2776	0004261	0584	14814
		STD	0900	0423	3498	2777	0004289	0627	14827
095		OBS	T0979	0416	3498	2777			14837
		STD	1000	0414	3498	2778	0004306	0670	14840
		STD	1100	0405	3497	2778	0004364	0713	14852
		STD	1200	0396	3497	2779	0004344	0757	14865
		STD	1300	0387	3497	2780	0004320	0800	14878
		STD	1400	0378	3496	2780	0004366	0844	14891
095		OBS	T1485	0370	3496	2781			14902

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4136 N	047165W		149	17	05	17	159	1963		8563	4130	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		16	F04		140			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0942	3353	2592	0020903	0000	14864
163		OBS	0000	0942	3353	2592			14864
		STD	0010	1197	3456	2629	0017450	0019	14970
		STD	0020	1361	3529	2651	0015366	0036	15036
163		OBS	0025	1409	3553	2660			15055
		STD	0030	1383	3551	2663	0014220	0050	15047
		STD	0050	1309	3547	2676	0013115	0078	15026
163		OBS	0050	1309	3547	2676			15026
163		OBS	0074	1279	3547	2682			15020
		STD	0075	1278	3547	2682	0012566	0110	15019
163		OBS	0099	1264	3545	2683			15018
		STD	0100	1264	3545	2683	0012535	0141	15019
		STD	0125	1259	3545	2684	0012506	0173	15021
163		OBS	0148	1250	3545	2686			15022
		STD	0150	1250	3545	2686	0012402	0204	15022
163		OBS	T0198	1214	3544	2692			15017
		STD	0200	1209	3544	2693	0011835	0264	15016
		STD	0250	1096	3535	2707	0010567	0320	14984
163		OBS	0297	0992	3526	2719			14953
		STD	0300	0985	3525	2719	0009507	0370	14951
163		OBS	0395	0785	3508	2738			14889
		STD	0400	0778	3508	2739	0007691	0456	14888
		STD	0500	0655	3505	2754	0006315	0526	14856
163		OBS	T0590	0574	3504	2764			14838
		STD	0600	0570	3504	2764	0005387	0585	14838
		STD	0700	0528	3504	2769	0004969	0637	14838
163		OBS	0788	0494	3504	2774			14838
		STD	0800	0489	3504	2774	0004590	0685	14838
		STD	0900	0455	3501	2776	0004493	0730	14840
163		OBS	T0987	0429	3499	2777			14844
		STD	1000	0426	3499	2777	0004381	0774	14845
		STD	1100	0402	3497	2778	0004326	0818	14851
		STD	1200	0384	3495	2778	0004341	0861	14860
		STD	1300	0371	3494	2779	0004339	0905	14871
		STD	1400	0364	3493	2779	0004406	0948	14885
163		OBS	T1494	0362	3493	2779			14900

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	41585N	04754 W		149	17	05	17	200	1963		8564	3650	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F03		105			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0836	3329	2590	0021108	0000	14821
205		OBS	0000	0836	3329	2590			14821
		STD	0010	0727	3330	2607	0019550	0020	14780
		STD	0020	0645	3331	2618	0018435	0039	14750
205		OBS	0029	0594	3332	2626			14731
		STD	0030	0593	3333	2626	0017681	0057	14731
		STD	0050	0578	3363	2652	0015284	0090	14732
205		OBS	0057	0573	3377	2664			14733
		STD	0075	0706	3430	2688	0011919	0124	14796
205		OBS	0086	0758	3450	2696			14821
		STD	0100	0775	3456	2699	0010974	0153	14830
205		OBS	0115	0786	3461	2701			14838
		STD	0125	0786	3463	2702	0010655	0180	14840
		STD	0150	0778	3468	2708	0010213	0206	14841
205		OBS	0171	0766	3471	2712			14840
		STD	0200	0735	3472	2717	0009431	0255	14833
205		OBS	T0228	0702	3472	2722			14825
		STD	0250	0658	3473	2728	0008351	0300	14811
		STD	0300	0580	3477	2742	0007118	0338	14789
205		OBS	0332	0545	3480	2748			14780
		STD	0400	0520	3488	2758	0005668	0402	14783
205		OBS	0428	0511	3490	2760			14784
		STD	0500	0493	3494	2766	0005034	0456	14789
205		OBS	T0599	0467	3497	2771			14795
		STD	0600	0467	3497	2771	0004611	0504	14795
		STD	0700	0438	3497	2774	0004408	0549	14800
		STD	0800	0414	3496	2776	0004260	0593	14806
205		OBS	0808	0412	3496	2776			14807
		STD	0900	0396	3495	2777	0004237	0635	14815
		STD	1000	0381	3493	2777	0004253	0678	14825
205		OBS	T1020	0379	3493	2777			14828
		STD	1100	0377	3493	2778	0004289	0720	14840
		STD	1200	0374	3494	2778	0004312	0763	14856
		STD	1300	0371	3494	2779	0004332	0806	14871
		STD	1400	0368	3494	2780	0004359	0850	14887
		STD	1500	0365	3495	2780	0004376	0894	14903
205		OBS	T1546	0364	3495	2780			14910

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4220 N	04834 W		149	28	05	18	005	1963		8565	3230	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F03		117			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1063	3440	2639	0016416	0000	14919
012		OBS	0000	1063	3440	2639			14919
		STD	0010	1019	3436	2644	0016019	0016	14904
		STD	0020	0993	3432	2645	0015921	0032	14896
012		OBS	0024	0987	3430	2645			14894
		STD	0030	0993	3434	2647	0015772	0048	14898
		STD	0050	1015	3452	2657	0014843	0079	14911
012		OBS	0050	1015	3452	2657			14911
012		OBS	0074	1047	3480	2673			14930
		STD	0075	1047	3481	2674	0013296	0114	14931
012		OBS	0099	1057	3501	2688			14941
		STD	0100	1057	3501	2688	0012026	0145	14941
		STD	0125	1069	3510	2693	0011636	0175	14950
012		OBS	0148	1079	3518	2697			14959
		STD	0150	1077	3518	2698	0011234	0204	14958
012		OBS	T0198	1017	3523	2712			14945
		STD	0200	1012	3523	2713	0009886	0256	14944
		STD	0250	0888	3515	2727	0008570	0303	14906
012		OBS	0299	0777	3508	2739			14871
		STD	0300	0775	3508	2739	0007477	0343	14870
		STD	0400	0583	3499	2759	0005649	0408	14810
012		OBS	0401	0582	3499	2759			14809
		STD	0500	0525	3499	2766	0005055	0462	14803
		STD	0600	0479	3499	2771	0004608	0510	14800
012		OBS	T0608	0476	3499	2772			14800
		STD	0700	0448	3499	2774	0004372	0555	14804
		STD	0800	0422	3498	2777	0004200	0598	14810
012		OBS	0809	0420	3498	2777			14810
		STD	0900	0402	3496	2777	0004235	0640	14818
		STD	1000	0386	3493	2777	0004320	0683	14827
012		OBS	T1009	0385	3493	2777			14828
		STD	1100	0381	3493	2777	0004334	0726	14842
		STD	1200	0377	3494	2778	0004339	0770	14857
		STD	1300	0372	3494	2779	0004341	0813	14872
		STD	1400	0368	3495	2780	0004340	0856	14887
		STD	1500	0364	3495	2780	0004346	0900	14902
012		OBS	T1513	0363	3495	2781			14904

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	42405N	04901 W		149	29	05	18	052	1963		8566	2370	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		11	F03		062			

MESSENGER TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0277	3284	2621	0018208	0000	14587
059		OBS	0000	0277	3284	2621			14587
		STD	0010	0194	3288	2630	0017304	0018	14553
		STD	0020	0135	3292	2637	0016634	0035	14528
059		OBS	0024	0118	3293	2639			14522
		STD	0030	0112	3308	2652	0015239	0051	14522
059		OBS	0049	0099	3347	2684			14525
		STD	0050	0098	3349	2686	0012038	0078	14525
059		OBS	0073	0091	3380	2711			14530
		STD	0075	0093	3382	2712	0009501	0105	14531
059		OBS	0097	0127	3402	2726			14553
		STD	0100	0137	3405	2728	0008043	0127	14558
		STD	0125	0217	3428	2740	0006900	0145	14601
059		OBS	0145	0273	3443	2748			14631
		STD	0150	0284	3445	2748	0006191	0162	14636
		STD	0200	0374	3463	2754	0005724	0192	14686
		STD	0250	0435	3477	2759	0005361	0219	14721
059		OBS	0291	0462	3484	2761			14740
		STD	0300	0461	3485	2762	0005104	0246	14741
059		OBS	0387	0448	3489	2767			14751
		STD	0400	0442	3489	2768	0004691	0294	14751
		STD	0500	0402	3490	2773	0004263	0339	14751
059		OBS	T0581	0381	3491	2776			14755
		STD	0600	0379	3491	2776	0004042	0381	14758
		STD	0700	0373	3491	2776	0004065	0421	14772
059		OBS	0780	0368	3491	2777			14783
		STD	0800	0367	3491	2777	0004084	0462	14786
		STD	0900	0364	3489	2776	0004284	0504	14801
059		OBS	T0980	0361	3488	2775			14813
		STD	1000	0360	3488	2775	0004381	0547	14816
		STD	1100	0358	3489	2776	0004381	0591	14832
		STD	1200	0355	3490	2777	0004368	0635	14847
		STD	1300	0353	3491	2778	0004366	0678	14863
		STD	1400	0351	3491	2779	0004362	0722	14879
059		OBS	T1460	0350	3492	2780			14892

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4320 N	04850 W		149	38	05	18	105	1963		8567	1700	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		14	F03		073			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0301	3307	2637	0016664	0000	14600
112		OBS	0000	0301	3307	2637			14600
		STD	0010	0243	3313	2646	0015767	0016	14578
		STD	0020	0210	3319	2654	0015077	0032	14566
112		OBS	0024	0204	3321	2656			14564
		STD	0030	0219	3349	2677	0012851	0046	14575
112		OBS	0047	0247	3405	2720			14598
		STD	0050	0248	3407	2721	0008693	0067	14599
112		OBS	0071	0251	3420	2731			14606
		STD	0075	0254	3421	2732	0007701	0088	14608
112		OBS	0095	0268	3426	2735			14618
		STD	0100	0272	3429	2737	0007262	0106	14621
		STD	0125	0288	3441	2745	0006512	0124	14633
112		OBS	0142	0297	3449	2750			14641
		STD	0150	0299	3452	2752	0005798	0139	14644
112		OBS	T0189	0317	3465	2761			14660
		STD	0200	0337	3469	2762	0004911	0166	14671
		STD	0250	0404	3482	2766	0004655	0190	14709
112		OBS	0284	0427	3488	2768			14725
		STD	0300	0419	3488	2769	0004416	0212	14724
112		OBS	0378	0393	3488	2772			14726
		STD	0400	0394	3489	2773	0004166	0255	14730
		STD	0500	0397	3492	2775	0004072	0296	14749
112		OBS	T0568	0399	3493	2775			14761
		STD	0600	0392	3492	2775	0004112	0337	14763
		STD	0700	0374	3491	2776	0004076	0378	14772
112		OBS	0758	0367	3490	2776			14779
		STD	0800	0365	3490	2776	0004151	0419	14785
		STD	0900	0360	3489	2776	0004216	0461	14799
112		OBS	T0950	0358	3489	2776			14807
		STD	1000	0356	3489	2777	0004260	0504	14814
		STD	1100	0353	3490	2777	0004277	0546	14830
		STD	1200	0351	3490	2778	0004305	0589	14846
		STD	1300	0349	3490	2778	0004331	0632	14862
		STD	1400	0348	3491	2779	0004369	0676	14878
112		OBS	T1450	0348	3491	2779			14886

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4306 N	04811 W		149	38	05	18	151	1963		8568	3000	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		16	F04		080			

MESSENGER or CAST NO. TIME HR 1/10	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0537	3334	2634	0016927	0000	14703
156	OBS	0000	0537	3334	2634			14703
	STD	0010	0478	3338	2644	0016000	0016	14681
	STD	0020	0418	3344	2655	0014948	0032	14658
156	OBS	0026	0382	3348	2662			14645
	STD	0030	0351	3351	2667	0013795	0046	14633
	STD	0050	0232	3371	2694	0011293	0071	14587
156	OBS	0051	0227	3372	2695			14585
	STD	0075	0163	3405	2726	0008215	0096	14565
156	OBS	0076	0160	3406	2727			14565
	STD	0100	0214	3427	2740	0006940	0115	14595
156	OBS	0102	0219	3429	2741			14598
	STD	0125	0297	3448	2749	0006064	0131	14638
	STD	0150	0353	3462	2755	0005550	0145	14668
156	OBS	0152	0356	3463	2756			14670
	STD	0200	0373	3472	2761	0005077	0172	14686
156	OBS	T0203	0374	3472	2761			14687
	STD	0250	0377	·3478	2766	0004675	0196	14697
	STD	0300	0388	3484	2769	0004385	0219	14711
156	OBS	0305	0390	3485	2770			14713
	STD	0400	0438	3496	2773	0004169	0262	14750
156	OBS	0405	0439	3496	2773			14751
	STD	0500	0418	3495	2775	0004076	0303	14758
	STD	0600	0400	3494	2776	0004046	0344	14767
156	OBS	T0606	0399	3494	2776			14767
	STD	0700	0386	3493	2777	0004055	0384	14777
	STD	0800	0374	3492	2777	0004083	0425	14789
156	OBS	0808	0373	3492	2777			14790
	STD	0900	0364	3491	2777	0004129	0466	14801
	STD	1000	0357	3490	2777	0004205	0508	14815
156	OBS	T1009	0356	3490	2777			14816
	STD	1100	0356	3491	2778	0004228	0550	14831
	STD	1200	0355	3492	2779	0004247	0592	14848
	STD	1300	0355	3492	2779	0004264	0635	14864
	STD	1400	0355	3493	2780	0004281	0677	14881
	STD	1500	0354	3494	2781	0004298	0720	14898
156	OBS	T1516	0354	3494	2781			14901

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4253 N	04732 W		149	27	05	18	195	1963		8569	3550	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		16	F04		116			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0905	3352	2597	0020413	0000	14850
201		OBS	0000	0905	3352	2597			14850
		STD	0010	0834	3352	2609	0019357	0020	14825
		STD	0020	0775	3353	2618	0018521	0039	14804
201		OBS	0027	0740	3353	2623			14791
		STD	0030	0730	3354	2625	0017816	0057	14788
		STD	0050	0671	3362	2640	0016464	0091	14769
201		OBS	0054	0661	3364	2642			14766
		STD	0075	0613	3387	2667	0013937	0129	14753
201		OBS	0080	0608	3393	2672			14753
		STD	0100	0627	3418	2689	0011830	0161	14767
201		OBS	0107	0630	3426	2695			14771
		STD	0125	0624	3440	2707	0010187	0189	14773
		STD	0150	0611	3456	2721	0008866	0213	14774
201		OBS	0159	0605	3461	2726			14774
		STD	0200	0568	3473	2740	0007135	0253	14767
201		OBS	T0213	0558	3476	2744			14766
		STD	0250	0540	3481	2750	0006264	0286	14765
		STD	0300	0521	3487	2757	0005651	0316	14766
201		OBS	0317	0515	3489	2759			14767
		STD	0400	0496	3496	2767	0004804	0368	14774
201		OBS	0419	0492	3497	2768			14775
		STD	0500	0468	3497	2771	0004512	0415	14779
		STD	0600	0445	3497	2774	0004349	0459	14786
201		OBS	T0618	0442	3497	2774			14788
		STD	0700	0436	3497	2775	0004318	0503	14799
		STD	0800	0425	3498	2776	0004251	0545	14811
201		OBS	0823	0422	3498	2777			14814
		STD	0900	0407	3497	2777	0004236	0588	14820
		STD	1000	0391	3495	2777	0004284	0630	14830
201		OBS	T1027	0387	3494	2777			14832
		STD	1100	0384	3494	2778	0004297	0673	14843
		STD	1200	0380	3495	2779	0004291	0716	14858
		STD	1300	0376	3496	2780	0004283	0759	14874
		STD	1400	0372	3496	2781	0004273	0802	14889
		STD	1500	0368	3497	2781	0004269	0845	14904
201		OBS	T1543	0366	3497	2782			14910

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4237 N	04655 W		149	26	05	18	234	1963		8570	3960	14

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F05		172			

MESSENGER TIME HR. 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	1589	3580	2641	0016309	0000	15112
239	OBS	0000	1589	3580	2641			15112
	STD	0010	1627	3598	2646	0015863	0016	15127
	STD	0020	1648	3610	2650	0015488	0032	15136
239	OBS	0024	1651	3613	2651			15138
	STD	0030	1643	3613	2653	0015191	0047	15137
239	OBS	0048	1611	3613	2661			15130
	STD	0050	1607	3612	2661	0014531	0077	15129
239	OBS	0073	1548	3602	2667			15113
	STD	0075	1540	3600	2667	0014028	0113	15111
239	OBS	0097	1468	3585	2671			15090
	STD	0100	1463	3585	2672	0013586	0147	15089
	STD	0125	1434	3583	2677	0013221	0181	15083
239	OBS	0144	1428	3581	2677			15084
	STD	0150	1437	3585	2678	0013181	0214	15089
239	OBS	T0193	1476	3602	2683			15110
	STD	0200	1476	3602	2683	0012905	0279	15112
	STD	0250	1453	3598	2685	0012863	0343	15112
239	OBS	0285	1410	3590	2688			15103
	STD	0300	1375	3583	2690	0012492	0407	15093
239	OBS	0374	1204	3553	2701			15044
	STD	0400	1172	3550	2705	0011212	0525	15037
	STD	0500	0951	3526	2726	0009291	0628	14971
239	OBS	T0543	0807	3511	2737			14923
005	OBS	T0563	0730	3503	2742			14895
	STD	0600	0657	3498	2748	0007010	0709	14872
	STD	0700	0515	3491	2761	0005765	0773	14831
005	OBS	0747	0475	3490	2765			14822
	STD	0800	0477	3495	2768	0005104	0827	14832
	STD	0900	0481	3502	2773	0004747	0877	14851
005	OBS	T0928	0482	3503	2774			14856
	STD	1000	0479	3502	2774	0004827	0924	14867
	STD	1100	0468	3501	2774	0004881	0973	14879
	STD	1200	0451	3500	2775	0004858	1022	14889
	STD	1300	0427	3498	2777	0004732	1070	14895
	STD	1400	0396	3497	2779	0004510	1116	14899
005	OBS	T1412	0392	3497	2779			14899

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4223 N	04613 W		149	26	05	19	036	1963		8571	4580	13

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F04		174			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1693	3611	2640	0016362	0000	15147
040		OBS	0000	1693	3611	2640			15147
		STD	0010	1689	3611	2641	0016293	0016	15147
		STD	0020	1684	3611	2642	0016222	0033	15147
040		OBS	0022	1683	3611	2642			15147
		STD	0030	1645	3611	2652	0015352	0048	15137
040		OBS	0043	1604	3612	2662			15127
		STD	0050	1600	3612	2663	0014355	0078	15127
040		OBS	0065	1595	3613	2665			15128
		STD	0075	1595	3613	2665	0014275	0114	15130
040		OBS	0087	1592	3613	2665			15131
		STD	0100	1582	3613	2668	0014048	0149	15130
		STD	0125	1564	3614	2672	0013692	0184	15128
040		OBS	0130	1561	3614	2673			15128
		STD	0150	1548	3612	2674	0013561	0218	15127
040		OBS	T0173	1535	3610	2676			15127
		STD	0200	1521	3608	2677	0013426	0285	15127
		STD	0250	1497	3605	2681	0013284	0352	15127
040		OBS	0261	1492	3604	2681			15127
		STD	0300	1479	3603	2683	0013197	0418	15129
040		OBS	0349	1453	3599	2686			15128
		STD	0400	1438	3594	2685	0013281	0551	15131
		STD	0500	1328	3577	2695	0012533	0680	15110
040		OBS	T0528	1278	3570	2700			15097
		STD	0600	1037	3537	2720	0010181	0793	15021
040		OBS	0697	0798	3509	2737			14944
		STD	0700	0794	3509	2737	0008388	0886	14943
		STD	0800	0679	3509	2754	0006818	0962	14915
040		OBS	T0864	0617	3508	2761			14901
		STD	0900	0603	3508	2763	0005939	1026	14901
		STD	1000	0562	3506	2767	0005659	1084	14902
		STD	1100	0522	3505	2771	0005304	1139	14902
		STD	1200	0482	3503	2774	0005021	1191	14902
		STD	1300	0442	3500	2776	0004811	1240	14902
040		OBS	T1342	0425	3499	2777			14902

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4250 N	04531 W		149	25	05	19	070	1963		8572	4640	15

WATER COLOR CODE	TRANS. (m)	WIND DIR	SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	WET BULB	VIS CODE	ADD'L OBS
		16	F04		162			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1521	3570	2648	0015580	0000	15089
075		OBS	0000	1521	3570	2648			15089
		STD	0010	1521	3569	2648	0015669	0016	15091
		STD	0020	1521	3569	2647	0015751	0031	15092
075		OBS	0026	1521	3568	2647			15093
		STD	0030	1527	3573	2649	0015580	0047	15096
		STD	0050	1547	3591	2659	0014757	0077	15108
075		OBS	0051	1548	3592	2659			15109
		STD	0075	1547	3593	2660	0014689	0114	15112
075		OBS	0076	1547	3593	2660			15113
		STD	0100	1540	3594	2662	0014544	0151	15114
075		OBS	0101	1539	3594	2663			15114
		STD	0125	1475	3587	2671	0013751	0186	15097
		STD	0150	1427	3580	2676	0013369	0220	15085
075		OBS	0152	1424	3579	2676			15084
		STD	0200	1390	3573	2679	0013211	0286	15080
075		OBS	T0203	1388	3573	2679			15080
		STD	0250	1337	3565	2684	0012929	0352	15070
		STD	0300	1284	3556	2687	0012672	0416	15059
075		OBS	0304	1280	3555	2688			15059
		STD	0400	1187	3550	2702	0011493	0537	15042
075		OBS	0405	1180	3549	2703			15040
		STD	0500	0920	3518	2725	0009364	0641	14959
		STD	0600	0720	3499	2740	0007838	0727	14897
075		OBS	T0606	0710	3498	2741			14894
		STD	0700	0623	3502	2756	0006388	0798	14876
075		OBS	0799	0548	3503	2766			14862
		STD	0800	0547	3503	2766	0005417	0857	14862
		STD	0900	0493	3500	2770	0005051	0909	14856
075		OBS	T0987	0454	3498	2773			14854
		STD	1000	0452	3498	2774	0004783	0959	14855
		STD	1100	0437	3496	2774	0004843	1007	14866
		STD	1200	0422	3495	2774	0004824	1055	14876
		STD	1300	0407	3494	2775	0004801	1103	14887
		STD	1400	0393	3494	2777	0004701	1151	14897
075		OBS	T1491	0379	3494	2778			14907

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4310 N	04521 W		149	35	05	19	097	1963		8573	4580	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		14	F03		155			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1358	3506	2634	0016937	0000	15029
102		OBS	0000	1358	3506	2634			15029
		STD	0010	1284	3505	2648	0015638	0016	15006
		STD	0020	1252	3503	2653	0015157	0032	14996
102		OBS	0022	1251	3503	2653			14996
		STD	0030	1294	3516	2655	0015046	0047	15014
102		OBS	0044	1352	3533	2656			15037
		STD	0050	1375	3537	2654	0015142	0077	15046
102		OBS	0066	1397	3546	2657			15057
		STD	0075	1363	3550	2667	0014023	0113	15048
102		OBS	0088	1332	3555	2677			15041
		STD	0100	1345	3560	2678	0013005	0147	15048
		STD	0125	1367	3569	2681	0012855	0180	15060
102		OBS	0131	1371	3571	2681			15063
		STD	0150	1377	3578	2686	0012461	0211	15068
102		OBS	T0175	1384	3581	2686			15075
		STD	0200	1307	3562	2688	0012390	0273	15052
		STD	0250	1199	3538	2690	0012216	0335	15020
102		OBS	0262	1182	3535	2691			15016
		STD	0300	1173	3543	2699	0011499	0394	15020
102		OBS	0349	1162	3548	2705			15025
		STD	0400	1035	3534	2718	0009918	0501	14987
		STD	0500	0829	3513	2735	0008278	0592	14924
102		OBS	T0522	0792	3510	2738			14913
		STD	0600	0693	3507	2750	0006857	0668	14887
		STD	0700	0592	3504	2762	0005815	0731	14863
102		OBS	0700	0592	3504	2762			14863
		STD	0800	0528	3502	2768	0005240	0786	14854
102		OBS	T0882	0485	3500	2771			14850
		STD	0900	0482	3500	2772	0004914	0837	14852
		STD	1000	0468	3500	2773	0004856	0886	14862
		STD	1100	0454	3500	2775	0004793	0934	14873
		STD	1200	0440	3499	2776	0004726	0982	14884
		STD	1300	0425	3499	2777	0004660	1029	14895
102		OBS	T1366	0416	3499	2778			14902

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4326 N	046025W		149	36	05	19	135	1963		8574	4570	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		99			165			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1242	3441	2607	0019499	0000	14982
141		OBS	0000	1242	3441	2607			14982
		STD	0010	1209	3457	2626	0017745	0019	14974
		STD	0020	1176	3475	2646	0015853	0035	14967
141		OBS	0025	1160	3485	2657			14963
		STD	0030	1204	3501	2661	0014465	0051	14981
		STD	0050	1320	3544	2671	0013548	0079	15029
141		OBS	0050	1320	3544	2671			15029
141		OBS	0074	1328	3556	2679			15037
		STD	0075	1326	3556	2679	0012855	0112	15037
141		OBS	0099	1288	3551	2683			15027
		STD	0100	1287	3551	2683	0012534	0143	15027
		STD	0125	1273	3549	2684	0012480	0175	15026
141		OBS	0148	1261	3548	2686			15026
		STD	0150	1261	3548	2686	0012391	0206	15026
141		OBS	T0198	1240	3547	2689			15027
		STD	0200	1238	3547	2690	0012160	0267	15026
		STD	0250	1176	3543	2699	0011424	0326	15013
141		OBS	0298	1092	3536	2709			14990
		STD	0300	1086	3535	2709	0010508	0381	14988
141		OBS	0397	0844	3512	2732			14913
		STD	0400	0839	3512	2733	0008319	0475	14911
		STD	0500	0696	3508	2751	0006667	0550	14872
141		OBS	T0599	0588	3505	2763			14845
		STD	0600	0587	3505	2763	0005538	0611	14845
		STD	0700	0522	3503	2769	0004966	0663	14835
141		OBS	0796	0470	3500	2773			14829
		STD	0800	0468	3500	2773	0004621	0711	14829
		STD	0900	0426	3496	2775	0004503	0757	14828
141		OBS	T0994	0395	3493	2776			14830
		STD	1000	0395	3493	2776	0004438	0802	14831
		STD	1100	0388	3493	2776	0004460	0846	14845
		STD	1200	0381	3493	2777	0004479	0891	14859
		STD	1300	0374	3492	2777	0004494	0936	14872
		STD	1400	0367	3492	2778	0004506	0981	14886
		STD	1500	0360	3492	2778	0004516	1026	14900
141		OBS	T1504	0360	3492	2779			14901

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES
EV	4331 N	04641 W		149	36	05	19	167	1963		8575	4210	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F04		128			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0944	3351	2590	0021082	0000	14864
172	OBS	0000	0944	3351	2590			14864
	STD	0010	0869	3361	2610	0019227	0020	14839
	STD	0020	0809	3371	2627	0017635	0039	14819
172	OBS	0024	0790	3375	2633			14813
	STD	0030	0758	3378	2640	0016421	0056	14802
172	OBS	0049	0728	3403	2664			14797
	STD	0050	0736	3407	2666	0013995	0086	14801
172	OBS	0073	0846	3467	2697			14854
	STD	0075	0844	3467	2697	0011104	0117	14854
172	OBS	0098	0825	3468	2701			14851
	STD	0100	0825	3469	2701	0010764	0145	14851
	STD	0125	0822	3475	2706	0010304	0171	14855
172	OBS	0146	0820	3480	2711			14858
	STD	0150	0824	3482	2712	0009844	0196	14861
172	OBS	T0195	0842	3497	2721			14877
	STD	0200	0835	3497	2722	0008990	0243	14875
	STD	0250	0757	3493	2730	0008232	0286	14853
172	OBS	0291	0690	3491	2738			14833
	STD	0300	0670	3490	2740	0007326	0325	14827
172	OBS	0385	0523	3486	2756			14781
	STD	0400	0522	3488	2758	0005712	0390	14783
	STD	0500	0507	3496	2766	0005055	0444	14795
172	OBS	T0571	0488	3499	2770			14799
	STD	0600	0471	3498	2771	0004585	0493	14797
	STD	0700	0424	3494	2773	0004428	0538	14793
172	OBS	0758	0404	3493	2775			14795
	STD	0800	0397	3493	2775	0004297	0581	14799
	STD	0900	0383	3492	2776	0004269	0624	14809
172	OBS	T0944	0378	3492	2777			14814
	STD	1000	0376	3492	2777	0004284	0667	14823
	STD	1100	0371	3492	2777	0004321	0710	14838
	STD	1200	0367	3492	2778	0004353	0753	14853
	STD	1300	0363	3492	2778	0004384	0797	14868
	STD	1400	0359	3492	2779	0004412	0841	14883
172	OBS	T1436	0357	3492	2779			14888

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4341 N	047185W		149	37	05	19	205	1963		8576	4020	16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS
		11	F03		098			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0673	3348	2628	0017495	0000	14760
209		OBS	0000	0673	3348	2628			14760
		STD	0010	0566	3348	2641	0016247	0017	14719
		STD	0020	0476	3347	2651	0015297	0033	14683
209		OBS	0026	0430	3347	2656			14665
		STD	0030	0412	3348	2659	0014566	0048	14658
		STD	0050	0314	3355	2674	0013154	0075	14621
209		OBS	0052	0303	3356	2676			14616
		STD	0075	0166	3375	2702	0010510	0105	14563
209		OBS	0078	0148	3380	2707			14556
		STD	0100	0512	3447	2726	0008293	0128	14724
209		OBS	0105	0563	3457	2728			14747
		STD	0125	0482	3456	2737	0007328	0148	14717
		STD	0150	0422	3454	2742	0006814	0166	14696
209		OBS	0156	0414	3454	2743			14694
		STD	0200	0452	3474	2755	0005718	0197	14720
209		OBS	T0208	0457	3477	2756			14724
		STD	0250	0451	3481	2760	0005237	0224	14728
		STD	0300	0447	3486	2765	0004873	0250	14736
209		OBS	0313	0446	3487	2765			14738
		STD	0400	0449	3495	2772	0004325	0296	14754
209		OBS	0416	0449	3496	2772			14757
		STD	0500	0435	3496	2774	0004203	0338	14765
		STD	0600	0419	3496	2776	0004121	0380	14775
209		OBS	T0625	0415	3496	2776			14777
		STD	0700	0404	3495	2777	0004098	0421	14785
		STD	0800	0392	3494	2777	0004127	0462	14797
209		OBS	0832	0388	3494	2777			14800
		STD	0900	0380	3494	2778	0004122	0503	14808
		STD	1000	0371	3493	2778	0004141	0545	14821
209		OBS	T1038	0368	3493	2779			14826
		STD	1100	0366	3493	2779	0004185	0586	14836
		STD	1200	0364	3493	2779	0004237	0628	14851
		STD	1300	0361	3493	2779	0004287	0671	14867
		STD	1400	0358	3493	2779	0004335	0714	14883
		STD	1500	0356	3493	2780	0004382	0756	14896
209		OBS	T1555	0354	3493	2780			14907

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4351 N	04756 W		149	37	05	20	002	1963		8577	3710	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		14	F02		099			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0851	3418	2657	0014712	0000	14838
007		OBS	0000	0851	3418	2657			14838
		STD	0010	0812	3418	2663	0014196	0014	14825
		STD	0020	0786	3417	2667	0013875	0028	14816
007		OBS	0026	0777	3417	2668			14814
		STD	0030	0779	3420	2670	0013586	0042	14816
		STD	0050	0788	3433	2679	0012780	0069	14824
007		OBS	0052	0789	3434	2679			14825
		STD	0075	0799	3438	2681	0012609	0100	14833
007		OBS	0078	0800	3439	2682			14834
		STD	0100	0799	3452	2692	0011616	0131	14839
007		OBS	0104	0799	3454	2693			14840
		STD	0125	0796	3465	2703	0010645	0158	14844
		STD	0150	0792	3475	2711	0009892	0184	14847
007		OBS	0155	0791	3476	2712			14848
		STD	0200	0742	3482	2724	0008750	0231	14837
007		OBS	T0207	0732	3483	2726			14835
		STD	0250	0611	3481	2741	0007181	0271	14794
		STD	0300	0520	3478	2750	0006340	0304	14765
007		OBS	0311	0507	3477	2751			14761
		STD	0400	0509	3491	2762	0005328	0363	14778
007		OBS	0413	0509	3493	2763			14781
		STD	0500	0482	3495	2768	0004820	0413	14784
		STD	0600	0453	3498	2773	0004407	0460	14789
007		OBS	T0619	0448	3498	2774			14790
		STD	0700	0426	3497	2775	0004244	0503	14795
		STD	0800	0404	3495	2777	0004194	0545	14802
007		OBS	0823	0400	3495	2777			14804
		STD	0900	0388	3494	2777	0004179	0587	14812
		STD	1000	0376	3493	2778	0004193	0629	14823
007		OBS	T1025	0373	3493	2778			14826
		STD	1100	0370	3493	2778	0004235	0671	14837
		STD	1200	0367	3493	2779	0004276	0713	14853
		STD	1300	0363	3493	2779	0004317	0756	14868
		STD	1400	0360	3493	2779	0004354	0800	14883
		STD	1500	0356	3493	2780	0004391	0843	14899
007		OBS	T1505	0356	3493	2780			14899

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4400 N	04829 W		149	48	05	20	035	1963		8578	3220	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F03		069			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0422	3315	2632	0017154	0000	14653
040		OBS	0000	0422	3315	2632			14653
		STD	0010	0333	3319	2643	0016036	0017	14617
		STD	0020	0275	3326	2654	0015024	0032	14595
040		OBS	0025	0258	3331	2660			14589
		STD	0030	0271	3338	2664	0014089	0047	14596
		STD	0050	0289	3366	2685	0012132	0073	14611
040		OBS	0050	0289	3366	2685			14611
		STD	0075	0237	3408	2723	0008547	0099	14599
040		OBS	0076	0235	3409	2724			14598
		STD	0100	0324	3434	2736	0007344	0119	14644
040		OBS	0101	0327	3435	2736			14645
		STD	0125	0366	3449	2744	0006639	0136	14668
		STD	0150	0401	3463	2752	0005922	0152	14689
040		OBS	0151	0402	3464	2752			14689
		STD	0200	0450	3482	2761	0005127	0179	14720
040		OBS	T0201	0451	3482	2761			14721
		STD	0250	0447	3486	2765	0004790	0204	14728
		STD	0300	0443	3491	2769	0004463	0227	14735
040		OBS	0301	0443	3491	2769			14735
		STD	0400	0416	3492	2773	0004185	0271	14740
040		OBS	0400	0416	3492	2773			14740
		STD	0500	0400	3492	2774	0004106	0312	14750
040		OBS	T0597	0386	3492	2776			14760
		STD	0600	0385	3492	2776	0004034	0353	14760
		STD	0700	0371	3491	2777	0004042	0393	14771
040		OBS	0794	0361	3490	2777			14782
		STD	0800	0361	3490	2777	0004091	0434	14783
		STD	0900	0357	3490	2777	0004129	0475	14798
040		OBS	T0990	0354	3490	2778			14812
		STD	1000	0354	3490	2778	0004177	0516	14813
		STD	1100	0353	3491	2778	0004212	0558	14830
		STD	1200	0352	3491	2778	0004253	0601	14846
		STD	1300	0351	3491	2779	0004295	0643	14863
		STD	1400	0351	3492	2779	0004335	0687	14879
040		OBS	T1464	0350	3492	2780			14890

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4407 N	04851 W		149	48	05	20	064	1963		8579	1640	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F03		036			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0208	3338	2669	0013594	0000	14564
071		OBS	0000	0208	3338	2669			14564
		STD	0010	0189	3353	2683	0012324	0013	14559
		STD	0020	0175	3366	2694	0011242	0025	14557
071		OBS	0026	0170	3374	2701			14556
		STD	0030	0170	3379	2705	0010226	0035	14558
		STD	0050	0172	3402	2723	0008499	0054	14565
071		OBS	0052	0172	3404	2725			14566
		STD	0075	0187	3428	2743	0006649	0073	14579
071		OBS	0078	0191	3430	2744			14582
		STD	0100	0231	3442	2750	0005942	0089	14605
071		OBS	0103	0236	3444	2752			14608
		STD	0125	0262	3453	2757	0005382	0103	14624
		STD	0150	0287	3461	2761	0005013	0116	14640
071		OBS	0154	0290	3462	2761			14642
		STD	0200	0317	3469	2764	0004721	0140	14662
071		OBS	T0206	0320	3470	2765			14665
		STD	0250	0339	3476	2768	0004445	0163	14681
		STD	0300	0354	3480	2770	0004336	0185	14696
071		OBS	0309	0356	3481	2770			14698
		STD	0400	0365	3483	2771	0004325	0229	14717
071		OBS	0409	0366	3483	2771			14719
		STD	0500	0371	3486	2773	0004227	0271	14737
		STD	0600	0377	3490	2775	0004121	0313	14757
071		OBS	T0610	0378	3490	2775			14759
		STD	0700	0376	3490	2776	0004141	0354	14773
		STD	0800	0373	3491	2776	0004164	0396	14788
071		OBS	0811	0373	3491	2776			14790
		STD	0900	0367	3491	2777	0004171	0438	14802
		STD	1000	0362	3491	2778	0004197	0479	14817
071		OBS	T1012	0361	3491	2778			14819
		STD	1100	0361	3491	2778	0004263	0522	14833
		STD	1200	0360	3491	2778	0004339	0565	14850
		STD	1300	0359	3491	2778	0004414	0608	14866
		STD	1400	0359	3491	2778	0004488	0653	14883
		STD	1500	0358	3491	2778	0004562	0698	14899
071		OBS	T1522	0358	3491	2778			14903

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44085N	04856 W		149	48	05	20	080	1963		8580	0605	05

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		16	F03		039			

MESSENGER TIME HR 1/10 or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0140	3299	2643	0016095	0000	14528
083	OBS	0000	0140	3299	2643			14528
	STD	0010	0111	3307	2651	0015309	0016	14518
	STD	0020	0091	3322	2664	0014050	0030	14513
083	OBS	0020	0091	3322	2664			14513
	STD	0030	0079	3351	2688	0011774	0043	14513
083	OBS	0039	0078	3371	2704			14517
	STD	0050	0099	3384	2714	0009384	0064	14530
083	OBS	0059	0113	3393	2720			14539
	STD	0075	0133	3403	2727	0008163	0086	14552
083	OBS	0079	0137	3405	2728			14555
	STD	0100	0157	3416	2735	0007349	0106	14569
083	OBS	0119	0172	3424	2741			14579
	STD	0125	0175	3425	2741	0006805	0123	14582
	STD	0150	0191	3429	2743	0006632	0140	14594
083	OBS	T0158	0197	3431	2744			14598
	STD	0200	0238	3444	2751	0005900	0172	14625
083	OBS	0242	0269	3453	2756			14646
	STD	0250	0272	3454	2757	0005471	0200	14649
	STD	0300	0288	3459	2759	0005273	0227	14665
083	OBS	0337	0299	3463	2761			14676
	STD	0400	0316	3469	2764	0004861	0278	14695
	STD	0500	0340	3477	2769	0004582	0325	14723
083	OBS	T0516	0343	3478	2769			14727

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44095N	04904 W		149	49	05	20	090	1963		8581	0157	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		16	F03		036			

MESSENGER TIME HR. 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0125	3294	2640	0016382	0000	14521
093	OBS	0000	0125	3294	2640			14521
	STD	0010	0123	3299	2644	0015987	0016	14522
	STD	0020	0120	3305	2649	0015517	0032	14524
093	OBS	0025	0119	3308	2651			14524
	STD	0030	0091	3311	2656	0014887	0047	14513
	STD	0050	0022	3328	2673	0013220	0075	14487
093	OBS	0050	0022	3328	2673			14487
	STD	0075	0028	3356	2695	0011112	0106	14498
093	OBS	0076	0029	3357	2696			14499
	STD	0100	0067	3372	2706	0010107	0132	14522
093	OBS	0101	0068	3373	2707			14523
	STD	0125	0093	3384	2714	0009353	0157	14540
	STD	0150	0105	3390	2718	0008977	0179	14550
093	OBS	T0152	0105	3390	2718			14550

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4411 N	04911 W		149	49	05	20	099	1963		8582	0100	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		16	F03		043			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0186	3280	2624	0017839	0000	14546
101		OBS	0000	0186	3280	2624			14546
		STD	0010	0104	3289	2637	0016637	0017	14513
		STD	0020	0043	3297	2647	0015695	0033	14488
101		OBS	0026	0015	3301	2652			14476
		STD	0030	0007	3303	2654	0015060	0049	14474
		STD	0050	-0016	3312	2662	0014254	0078	14467
101		OBS	0053	-0020	3313	2663			14467
		STD	0075	-0018	3318	2667	0013786	0113	14472
101		OBS	T0079	-0018	3319	2668			14473

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4414 N	04923 W		149	49	05	20	110	1963		8583	0050	00

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F02		066			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0367	3259	2593	0020859	0000	14622
112		OBS	0000	0367	3259	2593			14622
		STD	0010	0320	3269	2605	0019700	0020	14605
		STD	0020	0263	3278	2617	0018559	0039	14583
112		OBS	0022	0250	3280	2620			14578
		STD	0030	0195	3287	2629	0017376	0057	14556
112		OBS	T0044	0084	3298	2645			14510

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4457 N	04915 W		149	49	05	20	155	1963		8584	0097	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		18	F03		063			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0379	3260	2592	0020892	0000	14627
157		OBS	0000	0379	3260	2592			14627
		STD	0010	0261	3273	2613	0018919	0020	14580
		STD	0020	0165	3284	2629	0017397	0038	14541
157		OBS	0026	0119	3289	2636			14522
		STD	0030	0097	3291	2639	0016444	0055	14513
		STD	0050	0018	3301	2651	0015259	0087	14482
157		OBS	0051	0015	3302	2652			14481
		STD	0075	-0013	3318	2667	0013812	0123	14474
157		OBS	T0077	-0015	3320	2668			14474

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44555N	04907 W		149	49	05	20	165	1963		8585	0085	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		18	F03		035			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0200	3285	2627	0017556	0000	14553
167		OBS	0000	0200	3285	2627			14553
		STD	0010	0175	3285	2629	0017387	0017	14544
		STD	0020	0144	3285	2631	0017185	0035	14532
167		OBS	0026	0124	3285	2633			14524
		STD	0030	0106	3286	2634	0016892	0052	14516
		STD	0050	0025	3290	2642	0016148	0085	14483
167		OBS	0051	0021	3290	2642			14482
		STD	0075	-0057	3305	2658	0014618	0123	14452
167		OBS	T0077	-0063	3307	2660			14450

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44555N	04900 W		149	49	05	20	176	1963		8586	0573	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		20	F02		031			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0220	3288	2628	0017472	0000	14562
179		OBS	0000	0220	3288	2628			14562
		STD	0010	0140	3293	2638	0016551	0017	14529
		STD	0020	0075	3298	2646	0015788	0033	14502
179		OBS	0026	0042	3302	2651			14489
		STD	0030	0024	3305	2654	0014996	0049	14482
		STD	0050	-0037	3319	2669	0013615	0077	14459
179		OBS	0051	-0039	3320	2669			14458
		STD	0075	-0052	3325	2674	0013126	0111	14457
179		OBS	0076	-0052	3325	2674			14457
		STD	0100	-0026	3332	2678	0012714	0143	14474
179		OBS	0102	-0024	3332	2678			14475
		STD	0125	-0020	3335	2680	0012489	0174	14481
		STD	0150	-0016	3338	2683	0012282	0205	14488
179		OBS	0153	-0015	3338	2683			14489
		STD	0200	0060	3373	2707	0009988	0261	14536
179		OBS	T0204	0067	3376	2709			14540
		STD	0250	0171	3416	2734	0007497	0305	14600
		STD	0300	0258	3449	2754	0005752	0338	14650
179		OBS	0304	0264	3451	2755			14654
		STD	0400	0349	3481	2771	0004294	0388	14710
179		OBS	0405	0352	3482	2771			14713
		STD	0500	0364	3486	2773	0004172	0430	14734
179		OBS	T0554	0370	3488	2774			14746

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4453 N	04847 W		149	48	05	20	192	1963		8587	1225	10

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F02		046			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0222	3284	2625	0017789	0000	14563
196		OBS	0000	0222	3284	2625			14563
		STD	0010	0141	3291	2636	0016710	0017	14529
		STD	0020	0075	3299	2647	0015711	0033	14503
196		OBS	0025	0048	3303	2652			14492
		STD	0030	0022	3308	2657	0014750	0049	14481
		STD	0050	-0031	3328	2675	0012976	0076	14463
196		OBS	0050	-0031	3328	2675			14463
		STD	0075	0021	3348	2689	0011686	0107	14494
196		OBS	0075	0021	3348	2689			14494
		STD	0100	0129	3377	2706	0010113	0134	14551
196		OBS	0100	0129	3377	2706			14551
		STD	0125	0132	3390	2716	0009151	0159	14558
		STD	0150	0135	3407	2730	0007889	0180	14566
196		OBS	0150	0135	3407	2730			14566
		STD	0200	0264	3453	2756	0005445	0213	14637
196		OBS	T0200	0264	3453	2756			14637
		STD	0250	0277	3456	2758	0005365	0240	14651
196		OBS	0297	0292	3461	2760			14666
		STD	0300	0294	3462	2761	0005103	0266	14668
196		OBS	T0582	0374	3487	2773			14752
196		OBS	0394	0335	3475	2767			14703
		STD	0400	0337	3476	2768	0004546	0315	14705
		STD	0500	0361	3483	2771	0004355	0359	14732
		STD	0800	0382	3491	2775	0004256	0487	14792
		STD	0600	0375	3488	2774	0004221	0402	14755
		STD	0700	0381	3490	2775	0004229	0444	14775
196		OBS	0776	0382	3491	2775			14788
		STD	0900	0379	3491	2776	0004310	0530	14807
196		OBS	T0970	0374	3491	2776			14817

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4450 N	04836 W		149	48	05	20	210	1963		8588	2030	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F02		048			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0381	3320	2640	0016387	0000	14636
214		OBS	0000	0381	3320	2640			14636
		STD	0010	0278	3323	2652	0015270	0016	14594
		STD	0020	0207	3332	2664	0014047	0030	14566
214		OBS	0025	0183	3339	2672			14557
		STD	0030	0185	3354	2684	0012221	0044	14561
		STD	0050	0190	3400	2720	0008784	0065	14573
214		OBS	0052	0191	3404	2723			14574
		STD	0075	0223	3430	2741	0006772	0084	14595
214		OBS	0077	0225	3432	2743			14597
		STD	0100	0245	3441	2748	0006131	0100	14611
214		OBS	0104	0249	3443	2750			14613
		STD	0125	0268	3451	2754	0005584	0115	14626
		STD	0150	0289	3459	2759	0005181	0128	14640
214		OBS	0154	0292	3460	2760			14643
		STD	0200	0327	3473	2767	0004515	0153	14667
214		OBS	T0206	0331	3474	2767			14670
		STD	0250	0345	3478	2769	0004354	0175	14684
		STD	0300	0359	3481	2770	0004311	0196	14698
214		OBS	0309	0361	3482	2770			14701
		STD	0400	0379	3488	2773	0004084	0238	14724
214		OBS	0410	0380	3489	2774			14726
		STD	0500	0375	3490	2775	0003990	0279	14739
		STD	0600	0370	3491	2777	0003950	0318	14754
214		OBS	T0614	0369	3491	2777			14756
		STD	0700	0366	3491	2777	0003952	0358	14769
		STD	0800	0362	3492	2778	0003956	0397	14784
214		OBS	0815	0361	3492	2778			14786
		STD	0900	0359	3491	2778	0004062	0438	14799
		STD	1000	0356	3490	2777	0004191	0479	14814
214		OBS	T1015	0356	3490	2777			14817
		STD	1100	0354	3490	2778	0004260	0521	14830
		STD	1200	0352	3490	2778	0004317	0564	14846
		STD	1300	0351	3490	2778	0004385	0607	14862
		STD	1400	0349	3490	2778	0004440	0652	14878
		STD	1500	0348	3490	2778	0004506	0696	14895
214		OBS	T1527	0348	3490	2778			14899

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4445 N	04759 W		149	47	05	21	005	1963		8589	3200	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		22	F02		062			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0812	3400	2649	0015487	0000	14821
010		OBS	0000	0812	3400	2649			14821
		STD	0010	0737	3400	2660	0014496	0015	14793
		STD	0020	0694	3399	2665	0013980	0029	14778
010		OBS	0023	0688	3399	2666			14776
		STD	0030	0700	3404	2668	0013708	0043	14783
010		OBS	T0046	0735	3419	2675			14801
		STD	0050	0760	3426	2677	0012909	0070	14812
010		OBS	0069	0808	3450	2689			14837
		STD	0075	0776	3451	2695	0011317	0100	14826
010		OBS	0092	0704	3455	2708			14801
		STD	0100	0690	3456	2711	0009810	0126	14797
		STD	0125	0653	3462	2720	0008917	0150	14787
010		OBS	0137	0640	3465	2725			14785
		STD	0150	0639	3471	2729	0008103	0171	14787
010		OBS	T0183	0618	3481	2740			14786
		STD	0200	0563	3480	2747	0006522	0208	14766
		STD	0250	0450	3479	2758	0005398	0237	14728
010		OBS	0271	0424	3478	2761			14720
		STD	0300	0437	3483	2763	0004986	0263	14731
010		OBS	0357	0452	3490	2767			14748
		STD	0400	0441	3491	2769	0004536	0311	14750
		STD	0500	0418	3494	2774	0004196	0355	14758
010		OBS	T0521	0414	3494	2775			14760
		STD	0600	0396	3494	2776	0004038	0396	14765
010		OBS	0697	0383	3493	2777			14776
		STD	0700	0383	3493	2777	0004030	0436	14776
		STD	0800	0385	3494	2777	0004096	0477	14794
010		OBS	T0873	0386	3494	2777			14806
		STD	0900	0386	3494	2777	0004171	0518	14811
		STD	1000	0383	3494	2778	0004225	0560	14826
		STD	1100	0378	3494	2778	0004253	0603	14841
		STD	1200	0370	3493	2778	0004315	0645	14854
		STD	1300	0360	3493	2779	0004276	0688	14867
010		OBS	T1360	0352	3492	2779			14873

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	44385N	04718 W		149	47	05	21	045	1963		8590	3730	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F02		078			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0714	3366	2637	0016660	0000	14778
050		OBS	0000	0714	3366	2637			14778
		STD	0010	0715	3380	2647	0015664	0016	14782
		STD	0020	0718	3391	2656	0014899	0031	14787
050		OBS	0026	0721	3396	2659			14789
		STD	0030	0725	3397	2660	0014554	0046	14792
		STD	0050	0742	3407	2665	0014078	0075	14803
050		OBS	0051	0743	3408	2666			14804
		STD	0075	0730	3430	2685	0012242	0108	14805
050		OBS	0077	0728	3431	2686			14805
		STD	0100	0701	3442	2698	0010998	0137	14800
050		OBS	0103	0698	3443	2699			14799
		STD	0125	0690	3452	2708	0010147	0163	14801
		STD	0150	0678	3461	2716	0009356	0188	14801
050		OBS	0153	0676	3462	2717			14801
		STD	0200	0643	3479	2735	0007633	0230	14798
050		OBS	T0204	0640	3480	2736			14798
		STD	0250	0614	3485	2744	0006855	0266	14796
		STD	0300	0575	3491	2754	0005999	0298	14789
050		OBS	0307	0569	3492	2755			14788
		STD	0400	0462	3488	2765	0004972	0353	14759
050		OBS	0409	0455	3488	2765			14757
		STD	0500	0452	3492	2769	0004667	0401	14772
		STD	0600	0443	3497	2774	0004311	0446	14785
050		OBS	T0616	0441	3498	2775			14787
		STD	0700	0427	3497	2776	0004226	0489	14795
		STD	0800	0409	3496	2777	0004186	0531	14804
050		OBS	0820	0406	3496	2777			14806
		STD	0900	0390	3495	2778	0004159	0573	14813
		STD	1000	0373	3493	2778	0004157	0614	14822
050		OBS	T1022	0370	3493	2778			14824
		STD	1100	0367	3493	2779	0004183	0656	14836
		STD	1200	0364	3493	2779	0004217	0698	14851
		STD	1300	0360	3494	2780	0004243	0740	14867
		STD	1400	0357	3494	2780	0004268	0783	14882
		STD	1500	0353	3494	2781	0004289	0826	14898
050		OBS	T1540	0352	3494	2781			14904

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4432 N	04636 W		149	46	05	21	081	1963		8591	3750	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
			F00		088			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0823	3389	2639	0016461	0000	14824
087		OBS	0000	0823	3389	2639			14824
		STD	0010	0767	3393	2650	0015395	0016	14804
		STD	0020	0725	3397	2659	0014545	0031	14790
087		OBS	0026	0707	3399	2664			14784
		STD	0030	0703	3400	2665	0014049	0045	14784
		STD	0050	0685	3405	2671	0013481	0073	14780
087		OBS	0051	0684	3405	2671			14780
		STD	0075	0753	3436	2686	0012111	0105	14815
087		OBS	0077	0758	3438	2687			14818
		STD	0100	0818	3464	2698	0010998	0134	14848
087		OBS	0102	0821	3466	2700			14850
		STD	0125	0807	3470	2705	0010468	0160	14848
		STD	0150	0762	3474	2714	0009577	0185	14836
087		OBS	0153	0754	3474	2716			14833
		STD	0200	0567	3467	2735	0007600	0228	14766
087		OBS	T0204	0556	3466	2736			14762
		STD	0250	0536	3476	2746	0006589	0264	14763
		STD	0300	0523	3485	2755	0005824	0295	14767
087		OBS	0307	0522	3486	2756			14768
		STD	0400	0525	3499	2766	0004927	0349	14786
087		OBS	0410	0525	3500	2767			14788
		STD	0500	0484	3499	2770	0004576	0396	14786
		STD	0600	0447	3497	2774	0004351	0441	14787
087		OBS	T0617	0442	3497	2774			14788
		STD	0700	0420	3497	2776	0004188	0484	14792
		STD	0800	0401	3496	2778	0004099	0525	14801
087		OBS	0821	0398	3496	2778			14803
		STD	0900	0396	3496	2778	0004141	0566	14815
		STD	1000	0392	3496	2778	0004185	0608	14830
087		OBS	T1025	0391	3496	2779			14834
		STD	1100	0388	3496	2779	0004227	0650	14845
		STD	1200	0382	3496	2779	0004243	0692	14859
		STD	1300	0376	3495	2779	0004328	0735	14874
		STD	1400	0369	3495	2780	0004325	0778	14887
		STD	1500	0361	3494	2780	0004379	0822	14901
087		OBS	T1540	0358	3494	2780			14906

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4425 N	04556 W		149	45	05	21	118	1963		8592	3740	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F03		095			

MESSENGER TIME HR. 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0685	3354	2631	0017200	0000	14765
124	OBS	0000	0685	3354	2631			14765
	STD	0010	0525	3350	2648	0015620	0016	14702
	STD	0020	0436	3346	2654	0015014	0032	14666
124	OBS	0026	0417	3343	2654			14659
	STD	0030	0455	3352	2657	0014728	0047	14677
	STD	0050	0618	3395	2672	0013368	0075	14752
124	OBS	0052	0632	3399	2674			14759
	STD	0075	0758	3445	2693	0011505	0106	14818
124	OBS	0078	0774	3447	2692			14825
	STD	0100	0550	3420	2700	0010750	0134	14736
124	OBS	0104	0526	3418	2702			14727
	STD	0125	0617	3450	2716	0009353	0159	14772
	STD	0150	0666	3475	2729	0008156	0181	14798
124	OBS	0155	0668	3478	2731			14800
	STD	0200	0554	3475	2743	0006853	0218	14762
124	OBS	T0207	0540	3474	2744			14757
	STD	0250	0500	3478	2752	0006015	0250	14748
	STD	0300	0470	3483	2760	0005355	0279	14745
124	OBS	0310	0466	3484	2761			14745
	STD	0400	0465	3494	2769	0004589	0328	14761
124	OBS	0411	0464	3495	2770			14762
	STD	0500	0450	3496	2772	0004383	0373	14771
	STD	0600	0430	3497	2775	0004181	0416	14780
124	OBS	T0612	0427	3497	2776			14780
	STD	0700	0394	3494	2777	0004050	0457	14781
	STD	0800	0370	3491	2777	0004089	0498	14787
124	OBS	0814	0368	3491	2777			14788
	STD	0900	0367	3491	2777	0004173	0539	14802
	STD	1000	0366	3491	2777	0004247	0581	14819
124	OBS	T1015	0366	3491	2777			14821
	STD	1100	0364	3491	2777	0004291	0624	14835
	STD	1200	0362	3491	2778	0004335	0667	14850
	STD	1300	0358	3492	2778	0004354	0711	14866
	STD	1400	0354	3492	2779	0004371	0754	14881
	STD	1500	0349	3492	2780	0004372	0798	14895
124	OBS	T1520	0348	3492	2780			14898

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4419 N	04517 W		149	45	05	21	159	1963		8593	4310	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		18	F03		110			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0641	3280	2579	0022181	0000	14738
164		OBS	0000	0641	3280	2579			14738
		STD	0010	0632	3295	2592	0020955	0022	14738
		STD	0020	0623	3310	2605	0019730	0042	14738
		STD	0030	0614	3325	2618	0018505	0061	14736
164		OBS	0049	0597	3354	2643			14738
		STD	0050	0602	3426	2671	0013499	0093	14829
169		OBS	0051	0992	3492	2692			14908
		STD	0075	0903	3481	2696	0010999	0124	14876
169		OBS	0076	0899	3486	2696			14877
		STD	0100	0995	3511	2707	0010267	0150	14920
169		OBS	T0102	0997	3512	2707			14921
		STD	0125	0896	3501	2715	0009479	0175	14886
164		OBS	0145	0833	3495	2720			14865
		STD	0150	0829	3496	2722	0008601	0198	14864
164		OBS	T0194	0777	3499	2732			14852
		STD	0200	0759	3498	2734	0007804	0240	14846
		STD	0250	0630	3490	2746	0006720	0276	14803
164		OBS	0291	0559	3488	2753			14781
		STD	0300	0554	3489	2754	0005902	0307	14780
164		OBS	0386	0511	3497	2766			14778
		STD	0400	0509	3498	2767	0004811	0361	14779
		STD	0500	0494	3501	2771	0004526	0408	14790
164		OBS	T0576	0479	3502	2774			14797
		STD	0600	0471	3501	2774	0004383	0452	14797
		STD	0700	0441	3499	2776	0004259	0495	14801
164		OBS	0768	0426	3498	2776			14806
		STD	0800	0422	3498	2777	0004222	0538	14810
		STD	0900	0410	3497	2778	0004213	0580	14821
164		OBS	T0961	0403	3497	2778			14828
		STD	1000	0399	3497	2778	0004196	0622	14833
		STD	1100	0389	3496	2779	0004240	0664	14846
		STD	1200	0380	3496	2780	0004218	0706	14859
		STD	1300	0372	3495	2780	0004278	0749	14872
		STD	1400	0365	3494	2780	0004348	0792	14886
164		OBS	T1456	0362	3494	2780			14894

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4448 N	045145W		149	45	05	21	200	1963		8594	4020	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F04		094			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0826	3357	2613	0018883	0000	14821
205		OBS	0000	0826	3357	2613			14821
		STD	0010	0755	3371	2635	0016870	0018	14797
		STD	0020	0701	3381	2650	0015421	0034	14779
205		OBS	0024	0684	3385	2656			14773
		STD	0030	0671	3389	2661	0014451	0049	14769
205		OBS	0049	0641	3398	2672			14762
		STD	0050	0641	3398	2672	0013406	0077	14762
205		OBS	0073	0631	3404	2678			14763
		STD	0075	0624	3405	2679	0012766	0110	14760
205		OBS	0098	0573	3410	2690			14744
		STD	0100	0577	3412	2691	0011667	0140	14746
		STD	0125	0612	3436	2705	0010335	0168	14768
205		OBS	0146	0617	3449	2715			14775
		STD	0150	0609	3449	2716	0009346	0192	14772
205		OBS	T0195	0539	3452	2727			14752
		STD	0200	0539	3454	2729	0008207	0236	14753
		STD	0250	0542	3474	2744	0006814	0274	14765
205		OBS	0292	0545	3485	2752			14775
		STD	0300	0542	3486	2754	0005979	0306	14775
205		OBS	0387	0516	3494	2763			14780
		STD	0400	0512	3495	2764	0005070	0361	14780
		STD	0500	0485	3498	2770	0004640	0409	14786
205		OBS	T0575	0465	3499	2773			14790
		STD	0600	0458	3498	2773	0004429	0455	14791
		STD	0700	0433	3497	2775	0004312	0498	14798
205		OBS	0765	0420	3496	2775			14803
		STD	0800	0416	3496	2776	0004284	0541	14807
		STD	0900	0405	3496	2777	0004249	0584	14819
205		OBS	T0954	0399	3496	2778			14825
		STD	1000	0394	3496	2778	0004210	0626	14831
		STD	1100	0385	3496	2779	0004191	0668	14844
		STD	1200	0376	3495	2779	0004242	0711	14857
		STD	1300	0369	3495	2780	0004241	0753	14871
		STD	1400	0362	3494	2780	0004310	0796	14884
205		OBS	T1465	0358	3494	2780			14894

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4520 N	04515 W		149	55	05	21	237	1963		8595	3930	11

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		20	F04		097			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0861	3346	2600	0020206	0000	14832
243		OBS	0000	0861	3346	2600			14832
		STD	0010	0832	3362	2616	0018615	0019	14825
243		OBS	0018	0815	3372	2627			14821
		STD	0020	0813	3373	2628	0017528	0037	14821
		STD	0030	0803	3379	2634	0016979	0055	14820
243		OBS	0037	0796	3383	2638			14819
		STD	0050	0869	3442	2673	0013291	0085	14856
243		OBS	0055	0902	3460	2682			14872
243		OBS	0074	1053	3504	2691			14936
		STD	0075	1050	3504	2692	0011644	0116	14935
		STD	0100	0993	3499	2698	0011120	0145	14918
243		OBS	0110	0974	3498	2700			14912
		STD	0125	0947	3496	2705	0010475	0172	14905
243		OBS	T0147	0919	3499	2710			14898
		STD	0150	0919	3500	2711	0009965	0197	14899
		STD	0200	0913	3514	2723	0008905	0244	14907
243		OBS	0216	0911	3519	2727			14909
		STD	0250	0690	3483	2732	0008038	0287	14825
243		OBS	0282	0544	3462	2734			14769
		STD	0300	0544	3468	2739	0007347	0325	14773
		STD	0400	0546	3491	2757	0005783	0391	14794
243		OBS	T0406	0546	3492	2758			14795
		STD	0500	0523	3499	2766	0005030	0445	14802
243		OBS	0545	0509	3501	2769			14804
		STD	0600	0484	3500	2772	0004595	0493	14803
243		OBS	T0686	0450	3499	2775			14803
		STD	0700	0445	3499	2775	0004307	0538	14803
		STD	0800	0415	3498	2778	0004124	0580	14807
		STD	0900	0393	3496	2778	0004106	0621	14814
		STD	1000	0380	3495	2779	0004115	0662	14825
		STD	1100	0376	3494	2778	0004229	0704	14840
243		OBS	T1113	0376	3494	2778			14842

731-298 O—64——17

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4521 N	04600 W		149	56	05	22	038	1963		8596	3480	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		18	F04		091			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0637	3338	2625	0017795	0000	14744
044		OBS	0000	0637	3338	2625			14744
		STD	0010	0441	3339	2649	0015545	0017	14666
		STD	0020	0333	3345	2664	0014079	0031	14623
044		OBS	0023	0317	3346	2668			14617
		STD	0030	0363	3359	2672	0013302	0045	14639
044		OBS	0045	0441	3380	2681			14677
		STD	0050	0465	3387	2684	0012223	0071	14689
044		OBS	0068	0510	3409	2696			14713
		STD	0075	0494	3414	2702	0010536	0099	14709
044		OBS	0091	0473	3426	2714			14704
		STD	0100	0495	3436	2720	0008926	0123	14716
		STD	0125	0534	3457	2732	0007828	0144	14739
044		OBS	0135	0539	3463	2736			14743
		STD	0150	0519	3465	2740	0007087	0163	14738
044		OBS	T0181	0491	3471	2748			14732
		STD	0200	0495	3477	2752	0005974	0196	14738
		STD	0250	0505	3488	2760	0005332	0224	14752
044		OBS	0272	0510	3491	2761			14758
		STD	0300	0492	3492	2764	0004937	0250	14755
044		OBS	0362	0457	3493	2769			14751
		STD	0400	0439	3493	2771	0004397	0296	14750
		STD	0500	0402	3492	2774	0004166	0339	14751
044		OBS	T0543	0391	3491	2775			14753
		STD	0600	0384	3491	2775	0004097	0380	14760
		STD	0700	0374	3491	2776	0004076	0421	14772
044		OBS	0722	0372	3491	2777			14775
		STD	0800	0366	3491	2777	0004107	0462	14785
		STD	0900	0359	3490	2777	0004155	0504	14799
044		OBS	T0902	0359	3490	2777			14799
		STD	1000	0357	3490	2777	0004198	0545	14815
		STD	1100	0355	3490	2778	0004241	0587	14831
		STD	1200	0353	3491	2778	0004284	0630	14847
		STD	1300	0351	3491	2778	0004324	0673	14862
044		OBS	T1386	0349	3491	2779			14876

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	45205N	04640 W		149	56	05	22	077	1963		8597	3200	16

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		20	F04		088			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0665	3339	2622	0018067	0000	14756
083		OBS	0000	0665	3339	2622			14756
		STD	0010	0610	3342	2631	0017182	0018	14736
		STD	0020	0566	3347	2641	0016303	0034	14720
083		OBS	0027	0542	3353	2648			14712
		STD	0030	0535	3357	2652	0015213	0050	14710
		STD	0050	0500	3382	2676	0012975	0078	14703
083		OBS	0053	0497	3386	2680			14702
		STD	0075	0498	3418	2705	0010278	0107	14711
083		OBS	0080	0498	3424	2710			14712
		STD	0100	0492	3439	2722	0008668	0131	14715
083		OBS	0106	0488	3442	2725			14715
		STD	0125	0439	3445	2733	0007672	0151	14698
		STD	0150	0401	3450	2741	0006927	0170	14687
083		OBS	0161	0395	3453	2744			14687
		STD	0200	0439	3467	2750	0006101	0202	14713
083		OBS	T0214	0450	3471	2752			14721
		STD	0250	0450	3478	2758	0005447	0231	14728
		STD	0300	0449	3486	2764	0004897	0257	14737
083		OBS	0320	0449	3488	2766			14740
		STD	0400	0428	3491	2771	0004393	0303	14745
083		OBS	0426	0422	3492	2772			14747
		STD	0500	0406	3492	2774	0004195	0346	14752
		STD	0600	0387	3491	2775	0004116	0388	14761
083		OBS	T0636	0382	3491	2775			14765
		STD	0700	0375	3491	2776	0004087	0429	14772
		STD	0800	0366	3491	2777	0004073	0470	14785
083		OBS	0846	0363	3491	2777			14792
		STD	0900	0361	3491	2778	0004101	0511	14800
		STD	1000	0358	3491	2778	0004150	0552	14815
083		OBS	T1055	0357	3491	2778			14824
		STD	1100	0356	3491	2778	0004188	0594	14831
		STD	1200	0354	3492	2779	0004209	0636	14847
		STD	1300	0353	3492	2780	0004233	0678	14864
		STD	1400	0352	3493	2780	0004265	0720	14880
		STD	1500	0352	3494	2781	0004301	0763	14897
083		OBS	T1586	0352	3494	2781			14912

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4521 N	04722 W		149	57	05	22	124	1963		8598	2710	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		079			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0506	3341	2643	0016062	0000	14691
129		OBS	0000	0506	3341	2643			14691
		STD	0010	0384	3345	2659	0014538	0015	14643
		STD	0020	0305	3351	2671	0013384	0029	14611
129		OBS	0025	0281	3355	2677			14602
		STD	0030	0283	3359	2680	0012600	0042	14605
		STD	0050	0323	3383	2695	0011144	0066	14628
129		OBS	0051	0326	3384	2696			14630
		STD	0075	0441	3430	2721	0008771	0091	14689
129		OBS	0076	0446	3431	2721			14691
		STD	0100	0322	3437	2738	0007115	0111	14643
129		OBS	0101	0319	3437	2739			14642
		STD	0125	0323	3445	2745	0006509	0128	14649
		STD	0150	0327	3454	2751	0005925	0143	14656
129		OBS	0151	0327	3454	2751			14656
		STD	0200	0401	3474	2760	0005175	0171	14698
129		OBS	T0202	0403	3475	2761			14700
		STD	0250	0417	3482	2764	0004815	0196	14714
		STD	0300	0430	3489	2769	0004491	0219	14729
129		OBS	0303	0431	3489	2769			14730
		STD	0400	0450	3498	2773	0004146	0262	14755
129		OBS	0403	0451	3498	2774			14756
		STD	0500	0417	3495	2775	0004073	0304	14757
		STD	0600	0384	3492	2776	0004012	0344	14760
129		OBS	T0602	0383	3492	2776			14760
		STD	0700	0370	3492	2777	0003972	0384	14770
129		OBS	0799	0362					
		STD	0800	0362	3492	2778	0003991	0424	14784
		STD	0900	0362	3491	2778	0004091	0464	14800
129		OBS	T0996	0361	3491	2778			14816
		STD	1000	0361					
		STD	1100	0360					
		STD	1200	0358					
		STD	1300	0356					
		STD	1400	0353					
		STD	1500	0350					
129		OBS	T1501	0350					

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4535 N	04749 W		149	57	05	22	156	1963		8599	1540	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F03		065			

MESSENGER TIME HR 1/10 or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0434	3333	2645	0015917	0000	14660
160	OBS	0000	0434	3333	2645			14660
	STD	0010	0374	3346	2663	0014218	0015	14639
	STD	0020	0338	3364	2679	0012691	0029	14627
160	OBS	0025	0332	3369	2683			14626
	STD	0030	0356	3384	2693	0011353	0041	14639
160	OBS	0040	0361	3411	2714			14648
	STD	0050	0341	3412	2716	0009156	0061	14640
160	OBS	0071	0249	3417	2729			14604
	STD	0075	0280	3424	2732	0007693	0082	14619
160	OBS	0095	0403	3450	2741			14679
	STD	0100	0414	3453	2742	0006788	0100	14685
	STD	0125	0455	3465	2747	0006344	0117	14707
160	OBS	0142	0469	3472	2751			14717
	STD	0150	0464	3475	2754	0005720	0132	14717
160	OBS	T0190	0447	3485	2764			14718
	STD	0200	0446	3487	2765	0004697	0158	14720
	STD	0250	0451	3493	2770	0004338	0180	14730
160	OBS	0285	0453	3495	2771			14737
	STD	0300	0446	3495	2772	0004169	0202	14737
160	OBS	0378	0416	3494	2774			14737
	STD	0400	0410	3494	2775	0003970	0242	14738
	STD	0500	0389	3492	2776	0003985	0282	14745
160	OBS	T0564	0379	3491	2776			14752
	STD	0600	0376	3491	2776	0004024	0322	14756
	STD	0700	0369	3490	2776	0004072	0363	14770
160	OBS	0756	0366	3490	2776			14778
	STD	0800	0364	3490	2777	0004125	0404	14784
	STD	0900	0359	3490	2777	0004152	0445	14799
160	OBS	T0950	0357	3490	2777			14806
	STD	1000	0355	3490	2777	0004182	0487	14814
	STD	1100	0351	3490	2778	0004202	0529	14829
	STD	1200	0348	3491	2779	0004232	0571	14844
	STD	1300	0346	3491	2779	0004273	0613	14860
	STD	1400	0344	3491	2779	0004312	0656	14876
160	OBS	T1440	0343	3491	2779			14883

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	45415N	04802 W		149	58	05	22	179	1963		8600	0630	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		052			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0212	3289	2630	0017338	0000	14559
183		OBS	0000	0212	3289	2630			14559
		STD	0010	0137	3303	2646	0015772	0017	14529
		STD	0020	0090	3315	2659	0014577	0032	14512
183		OBS	0025	0077	3321	2664			14507
		STD	0030	0091	3326	2668	0013746	0046	14515
		STD	0050	0125	3345	2681	0012509	0072	14536
183		OBS	0051	0126	3346	2681			14537
		STD	0075	0118	3362	2695	0011178	0102	14540
183		OBS	0076	0118	3363	2696			14540
		STD	0100	0129	3393	2719	0008899	0127	14553
183		OBS	0101	0130	3394	2720			14554
		STD	0125	0137	3405	2728	0008079	0148	14562
		STD	0150	0157	3416	2735	0007393	0167	14577
183		OBS	0151	0158	3416	2735			14577
		STD	0200	0236	3443	2751	0005959	0201	14624
183		OBS	T0202	0239	3444	2751			14625
		STD	0250	0276	3454	2756	0005499	0229	14651
		STD	0300	0309	3465	2762	0005050	0256	14675
183		OBS	0302	0310	3465	2762			14675
		STD	0400	0353	3479	2769	0004507	0304	14712
183		OBS	0402	0354	3479	2769			14713
		STD	0500	0378	3487	2773	0004239	0347	14740
183		OBS	T0599	0384	3490	2774			14759

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	45465N	04808 W		149	58	05	22	192	1963		8601	0168	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		045			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0182	3278	2623	0017964	0000	14544
195		OBS	0000	0182	3278	2623			14544
		STD	0010	0119	3282	2631	0017259	0018	14518
		STD	0020	0057	3287	2638	0016529	0035	14493
195		OBS	0025	0026	3289	2641			14480
		STD	0030	-0020	3292	2646	0015781	0051	14460
		STD	0050	-0132	3303	2659	0014534	0081	14412
195		OBS	0051	-0134	3304	2660			14412
		STD	0075	-0102	3322	2673	0013154	0116	14433
195		OBS	0076	-0099	3323	2674			14435
		STD	0100	0017	3353	2693	0011280	0146	14497
195		OBS	0101	0021	3354	2694			14499
		STD	0125	0049	3371	2706	0010080	0173	14518
		STD	0150	0079	3375	2708	0009949	0198	14536
195		OBS	T0152	0081	3375	2707			14538

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4549 N	04814 W		149	58	05	22	200	1963		8602	0115	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		044			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0197	3280	2624	0017915	0000	14551
202		OBS	0000	0197	3280	2624			14551
		STD	0010	0125	3281	2630	0017356	0018	14521
		STD	0020	0064	3282	2634	0016917	0035	14495
202		OBS	0025	0038	3283	2636			14484
		STD	0030	0016	3285	2639	0016476	0051	14475
		STD	0050	-0054	3296	2651	0015329	0083	14448
202		OBS	0050	-0054	3296	2651			14448
		STD	0075	-0107	3320	2672	0013291	0119	14431
202		OBS	0075	-0107	3320	2672			14431
		STD	0100	-0049	3335	2682	0012347	0151	14464
202		OBS	T0100	-0049	3335	2682			14464

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	45555N	04825 W		149	58	05	22	212	1963		8603	0092	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		051			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0304	3280	2615	0018730	0000	14598
214		OBS	0000	0304	3280	2615			14598
		STD	0010	0187	3282	2626	0017696	0018	14549
		STD	0020	0093	3284	2634	0016954	0036	14509
214		OBS	0026	0047	3285	2637			14489
		STD	0030	0026	3285	2639	0016493	0052	14480
		STD	0050	-0053	3288	2644	0015968	0085	14447
214		OBS	0053	-0060	3288	2644			14445
		STD	0075	-0076	3319	2670	0013475	0122	14445
214		OBS	T0079	-0079	3327	2677			14445

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4605 N	04838 W		149	68	05	22	228	1963		8604	0082	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		053			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0375	3270	2601	0020102	0000	14627
231	OBS	0000	0375	3270	2601			14627
	STD	0010	0285	3276	2615	0018730	0019	14591
	STD	0020	0211	3285	2627	0017639	0038	14561
231	OBS	0026	0174	3288	2632			14546
	STD	0030	0165	3289	2633	0017019	0055	14543
	STD	0050	0089	3294	2642	0016183	0088	14513
231	OBS	0051	0084	3294	2642			14511
231	OBS	T0072	-0055	3320	2670			14454

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4617 N	04900 W		149	69	05	23	011	1963		8605	0065	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS
		22	F03		047			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0368	3257	2591	0021019	0000	14622
013	OBS	0000	0368	3257	2591			14622
	STD	0010	0320	3259	2597	0020455	0021	14604
	STD	0020	0265	3261	2603	0019862	0041	14582
013	OBS	0025	0235	3262	2606			14570
	STD	0030	0204	3266	2612	0019032	0060	14557
	STD	0050	0062	3290	2640	0016323	0096	14500
013	OBS	T0055	0022	3298	2649			14484

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4615 N	048335W		149	68	05	23	034	1963		8606	0092	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		047			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0374	3267	2598	0020319	0000	14626
037	OBS	0000	0374	3267	2598			14626
	STD	0010	0300	3274	2611	0019155	0020	14597
	STD	0020	0230	3279	2620	0018232	0038	14569
037	OBS	0026	0190	3282	2626			14553
	STD	0030	0163	3283	2629	0017453	0056	14541
	STD	0050	0042	3289	2640	0016317	0090	14491
037	OBS	0051	0037	3289	2641			14489
	STD	0075	-0068	3311	2663	0014117	0128	14448
037	OBS	T0077	-0075	3314	2666			14445

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4612 N	04804 W		149	68	05	23	057	1963		8607	0113	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		037			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0280	3281	2618	0018459	0000	14588
059		OBS	0000	0280	3281	2618			14588
		STD	0010	0197	3282	2625	0017750	0018	14553
		STD	0020	0121	3283	2632	0017164	0036	14521
059		OBS	0025	0086	3284	2634			14506
		STD	0030	0048	3285	2637	0016633	0052	14490
		STD	0050	-0065	3293	2649	0015517	0085	14442
059		OBS	0050	-0065	3293	2649			14442
		STD	0075	-0114	3310	2664	0014035	0122	14426
059		OBS	0075	-0114	3310	2664			14426
		STD	0100	-0045	3339	2685	0012058	0154	14466
059		OBS	T0100	-0045	3339	2685			14466

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4612 N	04745 W		149	67	05	23	074	1963		8608	0170	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		030			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0191	3285	2628	0017494	0000	14549
076		OBS	0000	0191	3285	2628			14549
		STD	0010	0157	3286	2631	0017207	0017	14536
		STD	0020	0107	3287	2635	0016837	0034	14515
076		OBS	0025	0076	3287	2637			14502
		STD	0030	0015	3291	2644	0016013	0051	14476
		STD	0050	-0142	3304	2660	0014430	0081	14408
076		OBS	0051	-0146	3305	2661			14406
		STD	0075	-0144	3316	2670	0013487	0116	14413
076		OBS	0076	-0143	3317	2671			14414
		STD	0100	-0080	3332	2681	0012454	0149	14449
076		OBS	0101	-0077	3333	2681			14451
		STD	0125	-0001	3354	2695	0011109	0178	14493
		STD	0150	0090	3381	2712	0009564	0204	14542
076		OBS	T0152	0098	3383	2713			14546

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4611 N	04722 W		149	67	05	23	091	1963		8609	0665	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F03		038			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0208	3301	2640	0016399	0000	14559
094	OBS	0000	0208	3301	2640			14559
	STD	0010	0200	3316	2652	0015207	0016	14559
	STD	0020	0174	3328	2664	0014118	0030	14551
094	OBS	0025	0155	3334	2670			14544
	STD	0030	0100	3338	2677	0012886	0044	14521
	STD	0050	-0009	3356	2697	0010935	0068	14477
094	OBS	0050	-0009	3356	2697			14477
	STD	0075	0115	3384	2713	0009487	0093	14541
094	OBS	0076	0118	3385	2713			14543
	STD	0100	0149	3407	2729	0007974	0115	14564
094	OBS	0101	0150	3408	2729			14565
	STD	0125	0183	3423	2739	0007016	0134	14585
	STD	0150	0218	3437	2747	0006239	0150	14607
094	OBS	0152	0221	3438	2748			14608
	STD	0200	0291	3460	2760	0005158	0179	14650
094	OBS	T0202	0293	3461	2760			14651
	STD	0250	0316	3467	2763	0004884	0204	14670
	STD	0300	0336	3474	2766	0004629	0228	14687
094	OBS	0302	0337	3474	2766			14688
	STD	0400	0364	3484	2772	0004235	0272	14717
094	OBS	0402	0364	3484	2772			14717
	STD	0500	0378	3489	2774	0004089	0314	14740
	STD	0600	0379	3489	2774	0004191	0355	14757
094	OBS	T0600	0379	3489	2774			14757

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46115N	047065W		149	67	05	23	108	1963		8610	1460	13

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F03		053			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0330	3331	2653	0015098	0000	14616
113	OBS	0000	0330	3331	2653			14616
	STD	0010	0313	3368	2684	0012163	0014	14615
	STD	0020	0298	3394	2706	0010077	0025	14614
113	OBS	0022	0295	3398	2710			14614
	STD	0030	0284	3405	2716	0009134	0034	14611
113	OBS	0044	0269	3416	2726			14609
	STD	0050	0268	3421	2731	0007803	0051	14610
113	OBS	0067	0260	3432	2740			14611
	STD	0075	0247	3436	2744	0006511	0069	14607
113	OBS	0089	0234	3442	2750			14604
	STD	0100	0242	3446	2753	0005729	0084	14610
	STD	0125	0263	3455	2758	0005240	0098	14625
113	OBS	0134	0272	3458	2760			14630
	STD	0150	0295	3464	2762	0004859	0111	14644
113	OBS	T0178	0327	3473	2767			14663
	STD	0200	0339	3477	2769	0004329	0134	14673
	STD	0250	0361	3483	2771	0004138	0155	14691
113	OBS	0268	0366	3485	2772			14696
	STD	0300	0369	3486	2773	0004039	0175	14703
113	OBS	0359	0373	3487	2773			14715
	STD	0400	0371	3488	2774	0004022	0216	14721
	STD	0500	0367	3489	2776	0003949	0256	14736
113	OBS	T0544	0366	3490	2776			14743
	STD	0600	0366	3490	2776	0003977	0295	14752
	STD	0700	0367	3490	2776	0004071	0335	14769
113	OBS	0723	0367	3490	2776			14773
	STD	0800	0365	3490	2776	0004136	0376	14785
	STD	0900	0362	3490	2777	0004187	0418	14800
113	OBS	T0900	0362	3490	2777			14800
	STD	1000	0359	3490	2777	0004236	0460	14816
	STD	1100	0356	3490	2777	0004284	0503	14831
	STD	1200	0353	3490	2778	0004329	0546	14846
113	OBS	T1285	0350	3490	2778			14859

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4607 N	04636 W		149	66	05	23	139	1963		8611	0685	07

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		066			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0460	3361	2664	0014075	0000	14675
143		OBS	0000	0460	3361	2664			14675
		STD	0010	0363	3370	2681	0012458	0013	14637
		STD	0020	0297	3378	2694	0011277	0025	14612
143		OBS	0024	0279	3381	2698			14605
		STD	0030	0278	3384	2700	0010667	0036	14606
143		OBS	0047	0274	3395	2709			14608
		STD	0050	0269	3398	2712	0009549	0056	14607
143		OBS	0070	0237	3418	2731			14599
		STD	0075	0226	3422	2735	0007401	0078	14596
143		OBS	0094	0208	3435	2747			14593
		STD	0100	0225	3439	2749	0006120	0094	14602
		STD	0125	0293	3455	2755	0005501	0109	14638
143		OBS	0141	0335	3465	2759			14660
		STD	0150	0364	3471	2761	0004981	0122	14674
143		OBS	T0188	0452	3490	2767			14720
		STD	0200	0447	3490	2768	0004459	0146	14720
		STD	0250	0427	3491	2771	0004249	0167	14720
143		OBS	0282	0416	3491	2772			14721
		STD	0300	0410	3491	2773	0004095	0188	14721
143		OBS	0376	0389	3491	2775			14725
		STD	0400	0385	3491	2775	0003923	0228	14727
		STD	0500	0371	3491	2777	0003865	0267	14738
143		OBS	T0564	0366	3491	2777			14746
		STD	0600	0366	3491	2777	0003899	0306	14752
143		OBS	T0685	0366	3491	2777			14766

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4606 N	04602 W		149	66	05	23	167	1963		8612	1690	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		078			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0535	3366	2660	0014505	0000	14707
172		OBS	0000	0535	3366	2660			14707
		STD	0010	0527	3385	2676	0013002	0014	14708
		STD	0020	0514	3399	2688	0011820	0026	14706
172		OBS	0025	0506	3404	2693			14704
		STD	0030	0492	3405	2696	0011125	0038	14699
		STD	0050	0446	3410	2704	0010297	0059	14684
172		OBS	0050	0446	3410	2704			14684
		STD	0075	0408	3428	2723	0008581	0083	14675
172		OBS	0075	0408	3428	2723			14675
		STD	0100	0401	3441	2734	0007557	0103	14678
172		OBS	0100	0401	3441	2734			14678
		STD	0125	0429	3458	2744	0006592	0121	14696
172		OBS	0149	0456	3472	2752			14713
		STD	0150	0458	3472	2753	0005849	0136	14714
172		OBS	T0199	0516	3491	2761			14748
		STD	0200	0516	3491	2761	0005162	0164	14748
		STD	0250	0513	3496	2765	0004815	0189	14756
172		OBS	0299	0510	3501	2769			14764
		STD	0300	0510	3501	2769	0004477	0212	14764
172		OBS	0398	0469	3502	2775			14763
		STD	0400	0468	3502	2775	0004028	0254	14763
		STD	0500	0409	3495	2776	0003983	0294	14754
172		OBS	T0599	0372	3491	2777			14754
		STD	0600	0372	3491	2777	0003965	0334	14755
		STD	0700	0366	3491	2777	0004024	0374	14769
		STD	0800	0361	3490	2777	0004091	0415	14783
172		OBS	0800	0361	3490	2777			14783
		STD	0900	0359	3490	2777	0004147	0456	14799
		STD	1000	0356	3490	2777	0004201	0498	14814
172		OBS	T1001	0356	3490	2777			14814
		STD	1100	0354	3490	2778	0004245	0540	14830
		STD	1200	0352	3490	2778	0004288	0582	14846
		STD	1300	0351	3491	2778	0004341	0626	14863
		STD	1400	0350	3491	2779	0004394	0669	14879
		STD	1500	0349	3491	2779	0004446	0713	14895
172		OBS	T1511	0349	3491	2779			14897

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SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4604 N	04519 W		149	65	05	23	206	1963		8613	2870	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		070			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0544	3379	2669	0013632	0000	14712
211		OBS	0000	0544	3379	2669			14712
		STD	0010	0430	3382	2684	0012223	0013	14667
		STD	0020	0365	3384	2692	0011399	0025	14642
211		OBS	0026	0349	3386	2695			14636
		STD	0030	0385	3393	2697	0010948	0036	14653
		STD	0050	0492	3420	2707	0010037	0057	14704
211		OBS	0053	0498	3423	2709			14708
		STD	0075	0447	3435	2724	0008456	0080	14692
211		OBS	0079	0440	3437	2726			14690
		STD	0100	0412	3445	2736	0007368	0100	14683
211		OBS	0105	0407	3447	2738			14682
		STD	0125	0400	3452	2743	0006745	0117	14683
		STD	0150	0391	3458	2748	0006230	0134	14684
211		OBS	0157	0389	3460	2750			14684
		STD	0200	0409	3474	2759	0005258	0162	14702
211		OBS	T0209	0411	3476	2761			14704
		STD	0250	0390	3479	2765	0004734	0187	14703
		STD	0300	0374	3481	2768	0004464	0210	14704
211		OBS	0312	0371	3482	2769			14705
		STD	0400	0369	3486	2772	0004160	0253	14720
211		OBS	0411	0369	3486	2773			14721
		STD	0500	0372	3488	2774	0004111	0295	14737
		STD	0600	0375	3490	2775	0004077	0336	14756
211		OBS	T0606	0375	3490	2775			14757
		STD	0700	0370	3491	2776	0004071	0377	14770
		STD	0800	0365	3491	2777	0004065	0417	14785
211		OBS	0806	0365	3491	2777			14786
		STD	0900	0361	3491	2777	0004136	0458	14800
		STD	1000	0356	3490	2777	0004203	0500	14814
211		OBS	T1005	0356	3490	2777			14815
		STD	1100	0353	3490	2778	0004218	0542	14830
		STD	1200	0351	3491	2778	0004246	0584	14846
		STD	1300	0349	3491	2779	0004273	0627	14862
		STD	1400	0349	3492	2779	0004323	0670	14879
		STD	1500	0349	3492	2780	0004380	0713	14895
211		OBS	T1514	0349	3492	2780			14898

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4602 N	044385W		149	64	05	24	004	1963		8614	3220	13

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F04		088			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0711	3370	2640	0016342	0000	14778
010		OBS	0000	0711	3370	2640			14778
		STD	0010	0728	3372	2639	0016428	0016	14786
		STD	0020	0744	3388	2650	0015474	0032	14796
010		OBS	0021	0746	3390	2651			14798
		STD	0030	0848	3431	2668	0013758	0047	14843
010		OBS	0043	0960	3475	2684			14893
		STD	0050	1011	3489	2687	0012045	0073	14915
010		OBS	0064	1053	3505	2692			14934
		STD	0075	1008	3500	2696	0011238	0102	14919
010		OBS	0085	0963	3495	2700			14904
		STD	0100	0869	3483	2705	0010348	0129	14870
		STD	0125	0750	3472	2715	0009478	0154	14827
010		OBS	0127	0743	3471	2715			14824
		STD	0150	0697	3472	2722	0008792	0176	14810
010		OBS	T0170	0661	3473	2728			14800
		STD	0200	0620	3476	2736	0007538	0217	14789
		STD	0250	0552	3482	2749	0006357	0252	14770
010		OBS	0253	0548	3482	2750			14769
		STD	0300	0476	3481	2757	0005588	0282	14747
010		OBS	0334	0439	3480	2761			14737
		STD	0400	0439	3487	2766	0004819	0334	14749
010		OBS	T0491	0440	3494	2772			14765
		STD	0500	0440	3494	2772	0004401	0380	14767
		STD	0600	0433	3495	2774	0004335	0424	14781
010		OBS	0656	0428	3496	2775			14788
		STD	0700	0422	3496	2775	0004278	0467	14793
		STD	0800	0408	3495	2776	0004256	0509	14804
010		OBS	T0822	0405	3495	2776			14806
		STD	0900	0395	3494	2777	0004277	0552	14815
		STD	1000	0382	3493	2777	0004287	0595	14826
		STD	1100	0370	3492	2778	0004304	0638	14837
		STD	1200	0358	3491	2778	0004316	0681	14849
010		OBS	T1292	0348	3489	2777			14860

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4619 N	04444 W		149	64	05	24	033	1963		8615	1720	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		22	F04		075			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0591	3428	2702	0010508	0000	14738
039		OBS	0000	0591	3428	2702			14738
		STD	0010	0583	3429	2703	0010352	0010	14736
		STD	0020	0563	3430	2707	0010054	0021	14730
039		OBS	0023	0555	3431	2709			14727
		STD	0030	0520	3433	2714	0009350	0030	14714
039		OBS	0047	0452	3438	2726			14690
		STD	0050	0445	3439	2728	0008110	0048	14687
039		OBS	0070	0398	3444	2736			14672
		STD	0075	0385	3446	2739	0007000	0067	14667
039		OBS	0093	0350	3452	2748			14656
		STD	0100	0349	3456	2751	0005925	0083	14658
		STD	0125	0347	3468	2761	0005023	0097	14663
039		OBS	0139	0346	3473	2765			14665
		STD	0150	0352	3476	2767	0004489	0108	14670
039		OBS	T0186	0367	3483	2771			14683
		STD	0200	0367	3484	2771	0004080	0130	14685
		STD	0250	0368	3486	2773	0003981	0150	14694
039		OBS	0280	0368	3487	2774			14699
		STD	0300	0369	3487	2774	0003934	0170	14703
039		OBS	0372	0371	3489	2775			14716
		STD	0400	0371	3489	2775	0003902	0209	14721
		STD	0500	0370	3490	2776	0003899	0248	14737
039		OBS	T0557	0368	3491	2777			14746
		STD	0600	0365	3491	2777	0003888	0287	14752
		STD	0700	0360	3491	2778	0003920	0326	14766
039		OBS	0741	0358	3491	2778			14772
		STD	0800	0356	3491	2778	0003982	0365	14781
		STD	0900	0354	3490	2778	0004088	0406	14797
039		OBS	T0923	0353	3490	2778			14800
		STD	1000	0351	3490	2778	0004121	0447	14812
		STD	1100	0350	3491	2778	0004161	0488	14829
		STD	1200	0348	3491	2779	0004181	0530	14845
		STD	1300	0347	3492	2779	0004219	0572	14861
		STD	1400	0347	3492	2780	0004268	0614	14878
039		OBS	T1401	0347	3492	2780			14878

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46295N	044445W		149	64	05	24	057	1963		8616	0620	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		22	F04		076			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0558	3427	2705	0010196	0000	14724
061		OBS	0000	0558	3427	2705			14724
		STD	0010	0555	3427	2706	0010138	0010	14724
		STD	0020	0551	3428	2707	0010073	0020	14725
061		OBS	0023	0550	3428	2707			14725
		STD	0030	0500	3429	2713	0009457	0030	14706
061		OBS	0047	0413	3430	2724			14672
		STD	0050	0407	3431	2725	0008323	0048	14670
061		OBS	0070	0370	3436	2733			14659
		STD	0075	0361	3438	2735	0007369	0067	14656
061		OBS	0094	0336	3446	2744			14650
		STD	0100	0334	3448	2746	0006384	0085	14650
		STD	0125	0326	3456	2753	0005726	0100	14652
061		OBS	0141	0321	3462	2758			14653
		STD	0150	0335	3466	2760	0005077	0113	14661
061		OBS	T0188	0379	3481	2768			14688
		STD	0200	0377	3482	2769	0004330	0137	14689
		STD	0250	0372	3484	2771	0004174	0158	14696
061		OBS	0283	0370	3486	2773			14701
		STD	0300	0370	3487	2774	0003974	0178	14704
061		OBS	0378	0368	3489	2775			14716
		STD	0400	0367	3489	2776	0003875	0218	14719
		STD	0500	0365	3490	2776	0003905	0257	14735
061		OBS	T0572	0363	3490	2777			14746

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46355N	04547 W		149	65	05	24	070	1963		8617	0217	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F04		078			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0567	3417	2696	0011049	0000	14727
072		OBS	0000	0567	3417	2696			14727
		STD	0010	0554	3420	2700	0010686	0011	14723
		STD	0020	0530	3422	2704	0010275	0021	14715
072		OBS	0025	0515	3424	2708			14710
		STD	0030	0485	3426	2713	0009489	0031	14699
		STD	0050	0401	3433	2727	0008113	0049	14668
072		OBS	0050	0401	3433	2727			14668
		STD	0075	0376	3439	2735	0007438	0068	14663
072		OBS	0075	0376	3439	2735			14663
		STD	0100	0315	3451	2750	0005982	0085	14642
072		OBS	0100	0315	3451	2750			14642
		STD	0125	0317	3455	2753	0005721	0100	14648
		STD	0150	0318	3459	2756	0005459	0114	14653
072		OBS	0151	0318	3459	2756			14653
		STD	0200	0384	3480	2767	0004551	0139	14692
072		OBS	T0201	0386	3481	2767			14693

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46405N	04449 W		149	64	05	24	077	1963		8618	0167	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		22	F04		079			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0553	3417	2698	0010887	0000	14721
079		OBS	0000	0553	3417	2698			14721
		STD	0010	0502	3417	2704	0010297	0011	14702
		STD	0020	0459	3418	2709	0009817	0021	14686
079		OBS	0025	0441	3418	2711			14679
		STD	0030	0426	3419	2714	0009397	0030	14674
		STD	0050	0380	3425	2723	0008509	0048	14658
079		OBS	0050	0380	3425	2723			14658
		STD	0075	0357	3433	2732	0007707	0068	14654
079		OBS	0075	0357	3433	2732			14654
		STD	0100	0350	3454	2749	0006081	0086	14658
079		OBS	0100	0350	3454	2749			14658
		STD	0125	0358	3467	2759	0005202	0100	14667
		STD	0150	0380	3471	2760	0005140	0113	14681
079		OBS	T0150	0380	3471	2760			14681

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46465N	04451 W		149	64	05	24	088	1963		8619	0140	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		22	F04		084			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0575	3418	2696	0011067	0000	14730
090		OBS	0000	0575	3418	2696			14730
		STD	0010	0572	3418	2696	0011047	0011	14730
		STD	0020	0569	3418	2696	0011027	0022	14731
090		OBS	0025	0568	3418	2697			14731
		STD	0030	0517	3420	2704	0010290	0033	14711
		STD	0050	0381	3429	2726	0008217	0051	14659
090		OBS	0050	0381	3429	2726			14659
		STD	0075	0370	3438	2734	0007473	0071	14660
090		OBS	0076	0369	3438	2735			14660
		STD	0100	0369	3448	2742	0006745	0089	14665
090		OBS	0101	0369	3448	2743			14665
		STD	0125	0374	3457	2749	0006109	0105	14672
090		OBS	T0126	0374	3457	2749			14673

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04501 W		149	65	05	24	096	1963		8620	0168	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F05		084			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0578	3418	2695	0011103	0000	14731
098		OBS	0000	0578	3418	2695			14731
		STD	0010	0532	3419	2702	0010510	0011	14714
		STD	0020	0492	3420	2707	0010004	0021	14700
098		OBS	0026	0472	3421	2710			14692
		STD	0030	0460	3422	2712	0009553	0031	14688
		STD	0050	0416	3425	2719	0008879	0049	14673
098		OBS	0051	0414	3425	2720			14673
		STD	0075	0398	3426	2722	0008631	0071	14670
098		OBS	0077	0397	3427	2723			14670
		STD	0100	0377	3437	2733	0007620	0091	14667
098		OBS	0103	0375	3439	2735			14667
		STD	0125	0377	3451	2744	0006590	0109	14673
		STD	0150	0380	3468	2757	0005360	0124	14680
098		OBS	T0155	0380	3472	2761			14682

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04513 W		149	65	05	24	113	1963		8621	0218	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F05		088			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0544	3411	2694	0011234	0000	14716
117		OBS	0000	0544	3411	2694			14716
		STD	0010	0493	3416	2704	0010304	0011	14698
		STD	0020	0454	3420	2711	0009600	0021	14684
117		OBS	0025	0439	3422	2715			14679
		STD	0030	0432	3423	2716	0009157	0030	14677
		STD	0050	0411	3427	2721	0008678	0048	14672
117		OBS	0051	0410	3427	2722			14671
		STD	0075	0403	3428	2723	0008531	0069	14673
117		OBS	0076	0402	3428	2723			14672
		STD	0100	0370	3438	2735	0007476	0089	14664
117		OBS	0102	0369	3439	2735			14664
		STD	0125	0385	3456	2747	0006293	0107	14677
		STD	0150	0397	3469	2756	0005461	0121	14688
117		OBS	0152	0398	3470	2757			14689
		STD	0200	0404	3481	2765	0004682	0147	14701
117		OBS	T0203	0404	3481	2765			14701

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46485N	04542 W		149	65	05	24	141	1963		8622	0265	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F06		086			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0516	3411	2697	0010920	0000	14705
144		OBS	0000	0516	3411	2697			14705
		STD	0010	0511	3411	2698	0010901	0011	14704
		STD	0020	0505	3410	2698	0010883	0022	14704
144		OBS	0024	0503	3410	2698			14703
		STD	0030	0461	3411	2704	0010359	0032	14687
144		OBS	0048	0376	3415	2716			14655
		STD	0050	0373	3415	2716	0009171	0052	14654
144		OBS	0073	0357	3419	2721			14651
		STD	0075	0358	3421	2722	0008620	0074	14653
144		OBS	0097	0369	3440	2736			14663
		STD	0100	0371	3442	2738	0007185	0094	14665
		STD	0125	0387	3456	2747	0006313	0111	14678
144		OBS	0146	0396	3465	2753			14686
		STD	0150	0397	3466	2754	0005686	0126	14687
144		OBS	T0194	0400	3478	2763			14698
		STD	0200	0400	3479	2764	0004790	0152	14699
144		OBS	T0243	0396	3486	2770			14705

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	046065W		149	66	05	24	165	1963		8623	0320	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		22	F06		075			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0491	3401	2692	0011397	0000	14693
168		OBS	0000	0491	3401	2692			14693
		STD	0010	0486	3402	2693	0011313	0011	14693
168		OBS	0019	0481	3402	2694			14692
		STD	0020	0474	3403	2696	0011086	0023	14690
		STD	0030	0411	3409	2707	0009998	0033	14666
168		OBS	0039	0374	3413	2714			14652
		STD	0050	0362	3414	2716	0009165	0052	14649
168		OBS	0058	0356	3416	2718			14648
		STD	0075	0354	3420	2722	0008659	0075	14651
168		OBS	0077	0354	3421	2723			14651
		STD	0100	0378	3438	2734	0007554	0095	14667
168		OBS	T0116	0388	3448	2741			14676
		STD	0125	0388	3451	2743	0006700	0113	14678
		STD	0150	0389	3460	2750	0006053	0129	14683
168		OBS	0161	0389	3464	2753			14686
		STD	0200	0384	3476	2763	0004851	0156	14692
		STD	0250	0370	3489	2775	0003779	0177	14696
168		OBS	T0251	0370	3489	2775			14696

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4647 N	04641 W		149	66	05	24	192	1963		8624	0660	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F04		049			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0440	3378	2680	0012593	0000	14669
194		OBS	0000	0440	3378	2680			14669
		STD	0010	0371	3387	2694	0011252	0012	14643
		STD	0020	0320	3394	2704	0010268	0023	14624
194		OBS	0025	0300	3397	2709			14616
		STD	0030	0298	3398	2710	0009759	0033	14616
		STD	0050	0271	3404	2716	0009150	0052	14609
194		OBS	0052	0267	3404	2717			14607
		STD	0075	0198	3428	2742	0006731	0071	14584
194		OBS	0077	0192	3430	2744			14582
		STD	0100	0282	3451	2753	0005689	0087	14628
194		OBS	0103	0292	3453	2754			14633
		STD	0125	0347	3467	2760	0005096	0100	14662
		STD	0150	0392	3479	2765	0004660	0113	14687
194		OBS	0154	0397	3481	2766			14690
		STD	0200	0424	3491	2771	0004143	0135	14710
194		OBS	T0205	0425	3492	2772			14712
		STD	0250	0401	3492	2774	0003905	0155	14709
		STD	0300	0385	3491	2775	0003823	0174	14710
194		OBS	0308	0383	3491	2775			14711
		STD	0400	0384	3491	2775	0003912	0213	14727
194		OBS	0410	0384	3491	2775			14728
		STD	0500	0378	3491	2776	0003940	0252	14741
		STD	0600	0365	3491	2777	0003888	0291	14752
194		OBS	T0614	0362	3491	2778			14753

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4647 N	04652 W		149	66	05	24	208	1963		8625	1200	10

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F04		047			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0387	3372	2680	0012525	0000	14646
212		OBS	0000	0387	3372	2680			14646
		STD	0010	0345	3395	2703	0010409	0011	14633
		STD	0020	0316	3412	2719	0008875	0021	14624
212		OBS	0024	0309	3417	2724			14623
		STD	0030	0310	3420	2726	0008222	0030	14624
212		OBS	0049	0312	3428	2732			14630
		STD	0050	0307	3429	2733	0007533	0045	14628
212		OBS	0073	0233	3440	2749			14601
		STD	0075	0235	3441	2749	0006036	0062	14602
212		OBS	0098	0259	3451	2755			14618
		STD	0100	0260	3452	2756	0005424	0077	14619
		STD	0125	0269	3459	2761	0004992	0090	14628
212		OBS	0145	0277	3464	2764			14635
		STD	0150	0285	3465	2764	0004694	0102	14640
212		OBS	T0194	0339	3476	2768			14671
		STD	0200	0343	3477	2768	0004368	0124	14674
		STD	0250	0366	3484	2772	0004114	0146	14693
212		OBS	0292	0376	3487	2773			14705
		STD	0300	0376	3487	2773	0004028	0166	14706
216		OBS	0365	0373	3488	2774			14716
		STD	0400	0373	3488	2774	0003991	0206	14722
		STD	0500	0373	3490	2775	0003998	0246	14738
216		OBS	T0549	0373	3490	2776			14746
		STD	0600	0369	3489	2775	0004058	0286	14753
		STD	0700	0364	3488	2775	0004202	0328	14767
216		OBS	0751	0361	3487	2774			14775
		STD	0800	0359	3487	2775	0004276	0370	14782
		STD	0900	0355	3488	2776	0004277	0413	14797
216		OBS	T0963	0354	3488	2776			14807

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04718 W		149	67	05	24	235	1963		8626	0600	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		27	F04		035			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0214	3316	2651	0015305	0000	14564
238		OBS	0000	0214	3316	2651			14564
		STD	0010	0213	3326	2659	0014541	0015	14566
		STD	0020	0212	3337	2668	0013702	0029	14569
238		OBS	0025	0211	3344	2674			14570
		STD	0030	0172	3354	2685	0012134	0042	14555
		STD	0050	0091	3384	2714	0009335	0063	14526
238		OBS	0050	0091	3384	2714			14526
238		OBS	0074	0149	3403	2725			14559
		STD	0075	0152	3404	2726	0008254	0085	14561
238		OBS	0099	0198	3415	2731			14586
		STD	0100	0198	3415	2732	0007695	0105	14587
		STD	0125	0202	3426	2740	0006938	0124	14594
238		OBS	0149	0205	3436	2748			14601
		STD	0150	0206	3436	2748	0006197	0140	14601
238		OBS	T0199	0261	3451	2755			14635
		STD	0200	0262	3451	2755	0005563	0169	14636
		STD	0250	0300	3461	2760	0005170	0196	14662
238		OBS	0297	0328	3471	2765			14683
		STD	0300	0329	3471	2765	0004732	0221	14684
238		OBS	0396	0359	3483	2771			14714
		STD	0400	0359	3483	2772	0004244	0266	14715
		STD	0500	0366	3486	2773	0004169	0308	14735
238		OBS	T0590	0372	3489	2775			14753

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4648 N	04725 W		149	67	05	25	007	1963		8627	0318	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		27	F04		030			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0205	3311	2648	0015620	0000	14559
010	OBS	0000	0205	3311	2648			14559
	STD	0010	0166	3315	2654	0015049	0015	14544
	STD	0020	0125	3320	2661	0014406	0030	14528
010	OBS	0026	0099	3325	2666			14518
	STD	0030	0069	3330	2672	0013317	0044	14506
	STD	0050	-0014	3352	2694	0011218	0068	14474
010	OBS	0051	-0015	3353	2695			14474
	STD	0075	0044	3377	2711	0009598	0094	14508
010	OBS	0077	0050	3379	2713			14512
	STD	0100	0138	3398	2722	0008581	0117	14558
010	OBS	0102	0144	3399	2723			14561
	STD	0125	0171	3412	2731	0007759	0138	14578
	STD	0150	0193	3424	2739	0007026	0156	14594
010	OBS	0154	0196	3426	2740			14596
	STD	0200	0216	3441	2751	0005945	0189	14615
010	OBS	0206	0219	3443	2752			14617
	STD	0250	0241	3452	2758	0005350	0217	14635
	STD	0300	0268	3458	2760	0005165	0243	14656
010	OBS	T0308	0273	3458	2760			14659

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4647 N	04738 W		149	67	05	25	025	1963		8628	0175	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F03		028			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0146	3291	2636	0016741	0000	14530
027	OBS	0000	0146	3291	2636			14530
	STD	0010	0132	3292	2638	0016593	0017	14526
	STD	0020	0118	3293	2639	0016446	0033	14521
027	OBS	0025	0111	3293	2640			14519
	STD	0030	0062	3296	2645	0015868	0049	14498
	STD	0050	-0076	3308	2661	0014329	0080	14439
027	OBS	0050	-0076	3308	2661			14439
	STD	0075	-0120	3323	2675	0013020	0114	14425
027	OBS	0075	-0120	3323	2675			14425
027	OBS	0099	-0033	3346	2690			14473
	STD	0100	-0030	3347	2691	0011513	0144	14474
	STD	0125	0054	3372	2707	0010032	0171	14520
	STD	0150	0132	3397	2722	0008626	0195	14563
027	OBS	T0150	0132	3397	2722			14563

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	46465N	04801 W		149	68	05	25	048	1963		8629	0118	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		27	F03		029			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0217	3291	2631	0017222	0000	14562
051	OBS	0000	0217	3291	2631			14562
	STD	0010	0217	3292	2632	0017164	0017	14563
	STD	0020	0217	3293	2632	0017106	0034	14565
051	OBS	0025	0217	3293	2633			14566
	STD	0030	0193	3295	2636	0016785	0051	14556
	STD	0050	0083	3301	2648	0015601	0084	14511
051	OBS	0050	0083	3301	2648			14511
	STD	0075	-0087	3325	2675	0012976	0119	14441
051	OBS	0075	-0087	3325	2675			14441
	STD	0100	-0028	3350	2693	0011293	0150	14476
051	OBS	T0100	-0028	3350	2693			14476

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4649 N	04843 W		149	68	05	25	078	1963		8630	0085	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F02		038			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0278	3282	2619	0018368	0000	14587
081	OBS	0000	0278	3282	2619			14587
	STD	0010	0276	3284	2620	0018235	0018	14588
	STD	0020	0247	3285	2624	0017891	0036	14577
081	OBS	0025	0223	3286	2626			14568
	STD	0030	0162	3291	2635	0016847	0054	14542
	STD	0050	-0005	3312	2661	0014312	0085	14473
081	OBS	0051	-0010	3313	2662			14471
	STD	0075	-0035	3342	2687	0011881	0118	14467
081	OBS	T0076	-0036	3343	2688			14467

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4714 N	04842 W		149	78	05	25	102	1963		8631	0090	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		20	F02		042			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0270	3284	2621	0018153	0000	14584
106		OBS	0000	0270	3284	2621			14584
		STD	0010	0260	3285	2623	0018015	0018	14581
		STD	0020	0249	3286	2624	0017885	0036	14578
106		OBS	0026	0243	3286	2625			14577
		STD	0030	0205	3287	2629	0017447	0054	14561
		STD	0050	0058	3300	2649	0015539	0087	14500
106		OBS	0051	0053	3301	2650			14498
		STD	0075	-0026	3333	2679	0012607	0122	14470
106		OBS	T0077	-0028	3337	2683			14470

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47136N	048395W		149	78	05	25	127	1963		8632	0113	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS
		18	F05		051			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0210	3291	2631	0017172	0000	14558
130		OBS	0000	0210	3291	2631			14558
		STD	0010	0209	3291	2632	0017137	0017	14560
		STD	0020	0192	3292	2633	0016996	0034	14554
130		OBS	0028	0167	3292	2635			14544
		STD	0030	0153	3293	2637	0016659	0051	14538
		STD	0050	0029	3300	2650	0015382	0083	14487
130		OBS	0055	0004	3302	2653			14476
		STD	0075	-0082	3320	2671	0013377	0119	14442
130		OBS	0082	-0093	3326	2676			14439
		STD	0100	-0074	3340	2687	0011865	0151	14453
130		OBS	T0110	-0034	3347	2691			14474

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4715 N	047575W		149	77	05	25	154	1963		8633	0170	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F02		054			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^{7}	Σ ΔD DYN. M. X 10^{3}	SOUND VELOCITY
		STD	0000	0194	3287	2629	0017363	0000	14551
157		OBS	0000	0194	3287	2629			14551
		STD	0010	0180	3288	2631	0017193	0017	14546
		STD	0020	0142	3291	2636	0016717	0034	14532
157		OBS	0026	0108	3293	2640			14518
		STD	0030	0054	3295	2645	0015902	0051	14494
		STD	0050	-0123	3307	2662	0014253	0081	14417
157		OBS	0051	-0128	3308	2663			14415
		STD	0075	-0121	3321	2673	0013170	0115	14424
157		OBS	0076	-0120	3322	2674			14425
		STD	0100	-0058	3338	2685	0012081	0147	14460
157		OBS	0102	-0053	3340	2686			14463
		STD	0125	0013	3359	2698	0010798	0175	14500
		STD	0150	0092	3382	2712	0009501	0201	14543
157		OBS	T0153	0102	3385	2714			14549

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47165N	04738 W		149	77	05	25	172	1963		8634	0223	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		14	F02		045			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^{7}	Σ ΔD DYN. M. X 10^{3}	SOUND VELOCITY
		STD	0000	0237	3287	2626	0017673	0000	14570
175		OBS	0000	0237	3287	2626			14570
		STD	0010	0206	3287	2629	0017449	0018	14558
		STD	0020	0158	3287	2632	0017123	0035	14538
175		OBS	0025	0127	3287	2634			14525
		STD	0030	0066	3292	2642	0016195	0052	14499
		STD	0050	-0094	3309	2663	0014190	0082	14431
175		OBS	0050	-0094	3309	2663			14431
		STD	0075	-0106	3321	2673	0013218	0116	14431
175		OBS	0075	-0106	3321	2673			14431
		STD	0100	-0065	3337	2684	0012129	0148	14457
175		OBS	0100	-0065	3337	2684			14457
		STD	0125	0002	3356	2697	0010971	0177	14494
		STD	0150	0063	3375	2709	0009855	0203	14529
175		OBS	0150	0063	3375	2709			14529
		STD	0200	0165	3413	2732	0007663	0247	14588
175		OBS	T0200	0165	3413	2732			14588

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47165N	04725 W		149	77	05	25	183	1963		8635	0267	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		042			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/°°	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0250	3305	2640	0016408	0000	14578
187	OBS	0000	0250	3305	2640			14578
	STD	0010	0236	3305	2641	0016274	0016	14573
	STD	0020	0197	3306	2644	0015962	0032	14558
187	OBS	0025	0168	3306	2646			14546
	STD	0030	0097	3308	2653	0015150	0048	14515
	STD	0050	-0067	3322	2672	0013291	0076	14446
187	OBS	0050	-0067	3322	2672			14446
187	OBS	0074	-0015	3349	2692			14477
	STD	0075	-0012	3350	2692	0011373	0107	14479
187	OBS	0099	0045	3369	2705			14512
	STD	0100	0047	3370	2705	0010146	0134	14513
	STD	0125	0095	3386	2715	0009214	0158	14541
187	OBS	0149	0133	3400	2724			14564
	STD	0150	0134	3401	2725	0008337	0180	14565
187	OBS	0198	0183	3424	2740			14597
	STD	0200	0184	3425	2741	0006900	0218	14598
187	OBS	T0246	0200	3433	2746			14614

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47195N	04051 W		149	76	05	25	207	1963		8636	1075	10

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS
		20	F03		045			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0312	3350	2670	0013507	0000	14611
211		OBS	0000	0312	3350	2670			14611
		STD	0010	0270	3351	2675	0013066	0013	14595
		STD	0020	0245	3353	2678	0012781	0026	14585
211		OBS	0024	0239	3353	2679			14584
		STD	0030	0255	3369	2690	0011616	0038	14594
211		OBS	0049	0263	3404	2717			14605
		STD	0050	0258	3405	2719	0008929	0059	14603
211		OBS	0073	0176	3416	2734			14573
		STD	0075	0175	3417	2735	0007594	0079	14573
211		OBS	0099	0170	3426	2742			14576
		STD	0100	0171	3426	2743	0006669	0097	14576
		STD	0125	0192	3435	2748	0006199	0113	14591
211		OBS	0147	0211	3442	2752			14604
		STD	0150	0213	3443	2753	0005747	0128	14605
211		OBS	T0196	0252	3454	2758			14631
		STD	0200	0257	3455	2759	0005233	0155	14634
		STD	0250	0306	3467	2764	0004805	0181	14665
211		OBS	0294	0336	3475	2767			14687
		STD	0300	0338	3476	2768	0004476	0204	14689
211		OBS	0391	0360	3483	2771			14714
		STD	0400	0361	3483	2771	0004246	0247	14716
		STD	0500	0369	3487	2774	0004149	0289	14736
211		OBS	T0586	0374	3490	2776			14753
		STD	0600	0374	3490	2776	0004058	0330	14756
		STD	0700	0378	3491	2776	0004100	0371	14774
211		OBS	0783	0380	3492	2776			14789
		STD	0800	0379	3492	2777	0004147	0412	14791
		STD	0900	0368	3492	2778	0004108	0454	14803
211		OBS	T0982	0353	3492	2779			14810

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4721 N	046195W		149	76	05	25	235	1963		8637	0617	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		049			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0484	3404	2695	0011097	0000	14691
239		OBS	0000	0484	3404	2695			14691
		STD	0010	0448	3404	2700	0010699	0011	14678
		STD	0020	0410	3405	2704	0010295	0021	14663
239		OBS	0024	0394	3405	2706			14657
		STD	0030	0364	3408	2711	0009620	0031	14646
239		OBS	0047	0300	3418	2725			14623
		STD	0050	0293	3420	2728	0008090	0049	14620
239		OBS	0070	0260	3435	2742			14611
		STD	0075	0257	3439	2746	0006367	0067	14612
239		OBS	0094	0252	3450	2755			14614
		STD	0100	0258	3451	2755	0005484	0082	14618
		STD	0125	0281	3458	2759	0005169	0095	14633
239		OBS	0142	0298	3465	2761			14644
		STD	0150	0308	3466	2763	0004826	0106	14650
239		OBS	T0189	0347	3480	2770			14675
		STD	0200	0353	3482	2771	0004090	0130	14679
		STD	0250	0374	3487	2773	0003970	0150	14697
239		OBS	0285	0382	3490	2775			14707
		STD	0300	0381	3490	2775	0003848	0170	14709
239		OBS	0384	0376	3491	2776			14721
		STD	0400	0375	3491	2776	0003817	0208	14723
		STD	0500	0366	3491	2777	0003811	0246	14736
239		OBS	T0586	0357	3491	2778			14746

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47175N	04552 W		149	75	05	26	018	1963		8638	0323	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		053			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0509	3406	2694	0011217	0000	14701
022	OBS	0000	0509	3406	2694			14701
	STD	0010	0502	3407	2696	0011077	0011	14700
	STD	0020	0485	3409	2699	0010754	0022	14695
022	OBS	0026	0470	3410	2702			14690
	STD	0030	0447	3411	2705	0010205	0033	14681
	STD	0050	0365	3417	2718	0009005	0052	14651
022	OBS	0052	0360	3417	2719			14649
	STD	0075	0349	3418	2721	0008769	0074	14648
022	OBS	0077	0346	3418	2721			14647
	STD	0100	0282	3434	2740	0006971	0094	14626
022	OBS	0103	0277	3436	2742			14624
	STD	0125	0293	3447	2749	0006104	0110	14636
	STD	0150	0320	3459	2756	0005463	0124	14654
022	OBS	0156	0328	3462	2758			14659
	STD	0200	0407	3483	2767	0004563	0150	14702
022	OBS	0207	0415	3485	2767			14707
	STD	0250	0395	3487	2771	0004209	0171	14706
	STD	0300	0372	3489	2775	0003872	0192	14705
022	OBS	T0310	0367	3489	2775			14704

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4719 N	04537 W		149	75	05	26	034	1963		8639	0278	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		054			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0518	3413	2699	0010792	0000	14706
037	OBS	0000	0518	3413	2699			14706
	STD	0010	0492	3413	2701	0010548	0011	14697
	STD	0020	0465	3412	2704	0010301	0021	14687
037	OBS	0025	0450	3412	2706			14682
	STD	0030	0429	3413	2709	0009878	0031	14674
	STD	0050	0369	3416	2717	0009081	0050	14652
037	OBS	0050	0369	3416	2717			14652
	STD	0075	0350	3418	2721	0008778	0072	14649
037	OBS	0076	0349	3418	2721			14648
	STD	0100	0307	3425	2730	0007891	0093	14635
037	OBS	0101	0306	3425	2730			14635
	STD	0125	0311	3440	2742	0006792	0112	14643
	STD	0150	0328	3454	2751	0005914	0126	14657
037	OBS	0151	0329	3455	2752			14657
	STD	0200	0404	3481	2765	0004682	0154	14701
037	OBS	0202	0406	3482	2766			14702
	STD	0250	0400	3485	2769	0004369	0177	14708
037	OBS	T0262	0398	3486	2770			14709

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4722 N	04510 W		149	75	05	26	057	1963		8640	0225	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		20	F03		059			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0514	3409	2696	0011047	0000	14704
061		OBS	0000	0514	3409	2696			14704
		STD	0010	0484	3409	2699	0010762	0011	14693
		STD	0020	0450	3408	2703	0010444	0022	14680
061		OBS	0026	0428	3406	2705			14672
		STD	0030	0406	3409	2708	0009949	0032	14664
		STD	0050	0323	3415	2721	0008731	0050	14633
061		OBS	0051	0320	3416	2722			14632
		STD	0075	0281	3433	2739	0007022	0070	14621
061		OBS	0076	0280	3434	2740			14621
		STD	0100	0282	3445	2748	0006140	0087	14627
061		OBS	0102	0282	3446	2749			14628
		STD	0125	0350	3463	2756	0005425	0101	14663
		STD	0150	0396	3476	2762	0004926	0114	14688
061		OBS	0153	0400	3477	2762			14691
		STD	0200	0400	3486	2770	0004265	0137	14700
061		OBS	T0204	0395	3486	2770			14698

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47255N	04502 W		149	75	05	26	072	1963		8641	0177	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F01		064			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0502	3406	2695	0011141	0000	14698
075		OBS	0000	0502	3406	2695			14698
		STD	0010	0496	3406	2696	0011057	0011	14698
		STD	0020	0477	3407	2698	0010833	0022	14692
075		OBS	0025	0464	3407	2700			14687
		STD	0030	0433	3410	2706	0010144	0033	14675
		STD	0050	0353	3418	2720	0008779	0051	14646
075		OBS	0050	0353	3418	2720			14646
		STD	0075	0350	3422	2724	0008470	0073	14649
075		OBS	0075	0350	3422	2724			14649
		STD	0100	0330	3439	2739	0007023	0092	14647
075		OBS	0100	0330	3439	2739			14647
		STD	0125	0331	3454	2751	0005923	0109	14654
		STD	0150	0354	3467	2759	0005184	0122	14669
075		OBS	T0170	0388	3476	2763			14688

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4730 N	04510 W		149	75	05	26	081	1963		8642	0225	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F02		061			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0492	3405	2695	0011108	0000	14694
083		OBS	0000	0492	3405	2695			14694
		STD	0010	0471	3405	2698	0010864	0011	14687
		STD	0020	0446	3406	2701	0010583	0022	14679
083		OBS	0024	0435	3406	2702			14675
		STD	0030	0409	3410	2708	0009903	0032	14665
083		OBS	0048	0358	3419	2721			14648
		STD	0050	0357	3419	2721	0008721	0051	14648
083		OBS	0072	0348	3423	2725			14648
		STD	0075	0334	3425	2728	0008095	0072	14643
083		OBS	0096	0273	3439	2744			14622
		STD	0100	0283	3442	2746	0006377	0090	14627
		STD	0125	0334	3458	2754	0005650	0105	14656
083		OBS	0145	0364	3469	2760			14673
		STD	0150	0370	3471	2761	0005040	0118	14677
083		OBS	T0195	0396	3486	2770			14697

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4742 N	04547 W		149	75	05	26	110	1963		8643	0305	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		25	F02		074			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0466	3407	2700	0010681	0000	14684
112		OBS	0000	0466	3407	2700			14684
		STD	0010	0445	3407	2702	0010443	0011	14677
		STD	0020	0422	3408	2705	0010189	0021	14669
112		OBS	0025	0410	3408	2707			14665
		STD	0030	0392	3410	2710	0009736	0031	14658
		STD	0050	0340	3417	2721	0008734	0049	14640
112		OBS	0050	0340	3417	2721			14640
		STD	0075	0323	3426	2730	0007920	0070	14638
112		OBS	0076	0322	3427	2730			14638
		STD	0100	0309	3447	2748	0006226	0088	14639
112		OBS	0101	0308	3448	2748			14639
		STD	0125	0373	3466	2757	0005423	0102	14673
		STD	0150	0413	3479	2763	0004876	0115	14696
112		OBS	0152	0415	3480	2763			14697
		STD	0200	0404	3486	2769	0004326	0138	14701
112		OBS	0202	0404	3486	2769			14702
		STD	0250	0394	3489	2773	0004026	0159	14706
112		OBS	T0293	0386	3489	2773			14709

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47463N	04558 W		149	75	05	26	121	1963		8644	0433	04

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F02		073			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0500	3425	2710	0009694	0000	14700
124		OBS	0000	0500	3425	2710			14700
		STD	0010	0447	3423	2715	0009262	0009	14680
		STD	0020	0405	3422	2718	0008967	0019	14663
124		OBS	0025	0389	3421	2719			14657
		STD	0030	0386	3425	2723	0008550	0027	14658
		STD	0050	0352	3439	2737	0007189	0043	14648
124		OBS	0050	0352	3439	2737			14648
		STD	0075	0256	3447	2752	0005777	0059	14612
124		OBS	0076	0254	3447	2752			14612
		STD	0100	0263	3453	2756	0005391	0073	14620
124		OBS	0101	0264	3453	2756			14621
		STD	0125	0293	3460	2759	0005124	0086	14638
		STD	0150	0321	3467	2762	0004871	0099	14655
124		OBS	0152	0323	3468	2763			14657
		STD	0200	0367	3481	2769	0004342	0122	14685
124		OBS	T0202	0368	3481	2769			14686
		STD	0250	0375	3486	2772	0004067	0143	14697
		STD	0300	0382	3491	2775	0003817	0163	14709
124		OBS	0303	0382	3491	2775			14710
		STD	0400	0365	3491	2777	0003712	0200	14719
124		OBS	T0404	0364	3491	2777			14719

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4756 N	04616 W		149	76	05	26	137	1963		8645	1030	10

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F02		074			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0466	3420	2710	0009705	0000	14685
141		OBS	0000	0466	3420	2710			14685
		STD	0010	0446	3420	2712	0009507	0010	14679
		STD	0020	0423	3420	2715	0009282	0019	14671
141		OBS	0025	0410	3420	2716			14666
		STD	0030	0394	3425	2722	0008627	0028	14661
		STD	0050	0334	3441	2740	0006871	0043	14641
141		OBS	0051	0331	3442	2742			14640
		STD	0075	0270	3449	2752	0005744	0059	14619
141		OBS	0076	0269	3449	2753			14618
		STD	0100	0279	3455	2757	0005377	0073	14627
141		OBS	0101	0280	3455	2757			14628
		STD	0125	0319	3464	2760	0005089	0086	14650
		STD	0150	0348	3473	2764	0004705	0098	14668
141		OBS	0151	0349	3473	2764			14668
		STD	0200	0369	3485	2772	0004062	0120	14686
141		OBS	T0202	0370	3485	2772			14687
		STD	0250	0374	3487	2773	0003981	0140	14697
		STD	0300	0379	3489	2774	0003923	0160	14708
141		OBS	0302	0379	3489	2774			14708
		STD	0400	0369	3490	2776	0003831	0199	14720
141		OBS	0402	0369	3490	2776			14720
		STD	0500	0362	3490	2777	0003843	0237	14734
		STD	0600	0356	3490	2777	0003865	0276	14748
141		OBS	T0600	0356	3490	2777			14748
		STD	0700	0350	3490	2778	0003884	0315	14762
141		OBS	0799	0346	3490	2778			14777
		STD	0800	0346	3490	2778	0003922	0354	14777
		STD	0900	0344	3492	2780	0003870	0393	14793
141		OBS	T0999	0344	3493	2781			14809

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4800 N	04621 W		149	86	05	26	149	1963		8646	1200	10

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		20	F02		089			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0519	3431	2713	0009453	0000	14709
153		OBS	0000	0519	3431	2713			14709
		STD	0010	0445	3427	2718	0008970	0009	14679
		STD	0020	0389	3425	2722	0008570	0018	14657
153		OBS	0025	0369	3424	2724			14649
		STD	0030	0368	3425	2724	0008392	0026	14650
		STD	0050	0339	3428	2730	0007897	0043	14641
153		OBS	0050	0339	3428	2730			14641
		STD	0075	0250	3445	2751	0005856	0060	14609
153		OBS	0075	0250	3445	2751			14609
		STD	0100	0260	3452	2756	0005448	0074	14619
153		OBS	0101	0261	3452	2756			14619
		STD	0125	0295	3459	2758	0005218	0087	14639
		STD	0150	0325	3466	2761	0004983	0100	14657
153		OBS	0150	0325	3466	2761			14657
		STD	0200	0367	3480	2768	0004402	0124	14685
153		OBS	T0201	0368	3480	2768			14685
		STD	0250	0372	3484	2771	0004181	0145	14696
		STD	0300	0376	3488	2774	0003974	0165	14706
153		OBS	0302	0376	3488	2774			14707
		STD	0400	0371	3490	2776	0003851	0205	14721
153		OBS	0402	0371	3490	2776			14721
		STD	0500	0370	3491	2776	0003891	0243	14737
		STD	0600	0369	3491	2777	0003932	0282	14753
153		OBS	T0602	0369	3491	2777			14754
		STD	0700	0360	3491	2777	0003958	0322	14766
		STD	0800	0351	3490	2778	0003979	0362	14779
153		OBS	0801	0351	3490	2778			14779
		STD	0900	0347	3491	2779	0003941	0401	14794
		STD	1000	0345	3492	2780	0003925	0440	14810
153		OBS	T1001	0345	3492	2780			14810

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48195N	04555 W		149	85	05	26	179	1963		8647	1090	10

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		22	F03		082			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0536	3438	2716	0009120	0000	14717
184	OBS	0000	0536	3438	2716			14717
	STD	0010	0464	3436	2723	0008493	0009	14688
	STD	0020	0406	3434	2728	0008059	0017	14666
184	OBS	0025	0383	3433	2729			14657
	STD	0030	0367	3433	2731	0007780	0025	14651
	STD	0050	0320	3432	2735	0007423	0040	14634
184	OBS	0050	0320	3432	2735			14634
	STD	0075	0294	3447	2749	0006079	0057	14629
184	OBS	0075	0294	3447	2749			14629
	STD	0100	0279	3455	2757	0005362	0071	14627
184	OBS	0100	0279	3455	2757			14627
	STD	0125	0322	3467	2762	0004861	0084	14652
184	OBS	0149	0349	3475	2766			14668
	STD	0150	0349	3475	2766	0004523	0096	14669
184	OBS	T0199	0362	3483	2771			14683
	STD	0200	0362	3483	2771	0004098	0117	14683
	STD	0250	0369	3487	2773	0003950	0138	14695
184	OBS	0299	0376	3490	2775			14706
	STD	0300	0376	3490	2775	0003811	0157	14707
184	OBS	0399	0380	3492	2776			14725
	STD	0400	0380	3492	2776	0003796	0195	14725
	STD	0500	0377	3492	2777	0003855	0233	14740
184	OBS	T0599	0373	3492	2777			14755
	STD	0600	0373	3492	2777	0003901	0272	14755
	STD	0700	0367	3492	2778	0003923	0311	14769
184	OBS	0796	0360	3492	2779			14782
	STD	0800	0360	3492	2779	0003931	0350	14783
	STD	0900	0352	3492	2779	0003924	0390	14796
184	OBS	T0993	0344	3492	2780			14808

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4840 N	045265W		149	85	05	26	209	1963		8648	1100	10

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F03		076			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0494	3439	2722	0008578	0000	14700
213		OBS	0000	0494	3439	2722			14700
		STD	0010	0456	3438	2726	0008243	0008	14685
		STD	0020	0428	3437	2728	0008025	0017	14675
213		OBS	0025	0418	3437	2729			14672
		STD	0030	0416	3437	2729	0007938	0025	14672
		STD	0050	0406	3437	2730	0007857	0040	14671
213		OBS	0051	0405	3437	2730			14671
		STD	0075	0334	3442	2741	0006830	0059	14645
213		OBS	0076	0331	3442	2742			14644
		STD	0100	0253	3450	2755	0005541	0074	14615
213		OBS	0101	0251	3450	2755			14615
		STD	0125	0297	3462	2761	0005010	0087	14640
		STD	0150	0329	3475	2768	0004382	0099	14660
213		OBS	0151	0330	3475	2768			14660
		STD	0200	0345	3482	2772	0004035	0120	14676
213		OBS	T0202	0346	3482	2772			14677
		STD	0250	0357	3485	2773	0003955	0140	14690
		STD	0300	0368	3488	2774	0003897	0160	14703
213		OBS	0303	0369	3488	2774			14704
		STD	0400	0377	3489	2774	0003986	0199	14723
213		OBS	0403	0377	3489	2774			14724
		STD	0500	0374	3490	2775	0004010	0239	14739
		STD	0600	0371	3490	2776	0004029	0279	14754
213		OBS	T0604	0371	3490	2776			14755
		STD	0700	0365	3490	2776	0004052	0320	14768
		STD	0800	0359	3490	2777	0004070	0360	14782
213		OBS	0804	0359	3490	2777			14783
		STD	0900	0353	3490	2778	0004084	0401	14796
		STD	1000	0345	3490	2778	0004073	0442	14810
213		OBS	T1004	0345	3490	2778			14810

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4901 N	045005W		149	95	05	27	001	1963		8649	1730	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		056			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0524	3445	2723	0008460	0000	14713
005		OBS	0000	0524	3445	2723			14713
		STD	0010	0500	3446	2727	0008145	0008	14705
		STD	0020	0481	3447	2730	0007889	0016	14699
005		OBS	0025	0474	3447	2731			14697
		STD	0030	0471	3447	2731	0007765	0024	14696
		STD	0050	0460	3446	2731	0007742	0040	14695
005		OBS	0050	0460	3446	2731			14695
		STD	0075	0364	3448	2743	0006646	0058	14659
005		OBS	0075	0364	3448	2743			14659
		STD	0100	0318	3462	2759	0005181	0072	14645
005		OBS	0100	0318	3462	2759			14645
		STD	0125	0336	3471	2764	0004691	0085	14658
005		OBS	0149	0347	3478	2769			14668
		STD	0150	0347	3478	2769	0004283	0096	14668
005		OBS	T0199	0354	3484	2773			14680
		STD	0200	0354	3484	2773	0003951	0117	14680
		STD	0250	0359	3485	2773	0004007	0136	14690
005		OBS	0299	0364	3485	2773			14701
		STD	0300	0364	3485	2773	0004063	0157	14701
005		OBS	0397	0361	3489	2776			14716
		STD	0400	0361	3489	2776	0003820	0196	14717
		STD	0500	0359	3490	2777	0003849	0234	14732
005		OBS	T0596	0357	3490	2777			14748
		STD	0600	0357	3490	2777	0003876	0273	14748
		STD	0700	0352	3490	2778	0003906	0312	14763
005		OBS	0794	0349	3490	2778			14777
		STD	0800	0349	3490	2778	0003956	0351	14778
		STD	0900	0346	3490	2778	0004041	0391	14793
005		OBS	T0991	0344	3489	2778			14808
		STD	1000	0344	3489	2778	0004136	0432	14809
		STD	1100	0342	3489	2778	0004162	0474	14825
		STD	1200	0340	3490	2779	0004188	0515	14841
		STD	1300	0339	3490	2779	0004224	0557	14857
		STD	1400	0338	3491	2780	0004259	0600	14874
005		OBS	T1495	0338	3491	2780			14890

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4910 N	04538 W		149	95	05	27	037	1963		8650	2790	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F03		054			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0498	3443	2725	0008322	0000	14702
042		OBS	0000	0498	3443	2725			14702
		STD	0010	0480	3443	2727	0008108	0008	14696
		STD	0020	0463	3444	2729	0007907	0016	14691
042		OBS	0026	0452	3444	2731			14687
		STD	0030	0445	3444	2731	0007729	0024	14685
		STD	0050	0409	3443	2735	0007441	0039	14673
042		OBS	0051	0407	3443	2735			14672
		STD	0075	0363	3450	2745	0006456	0057	14659
042		OBS	0077	0360	3451	2746			14658
		STD	0100	0323	3454	2752	0005852	0072	14646
042		OBS	0103	0318	3454	2752			14645
		STD	0125	0261	3452	2756	0005464	0086	14623
		STD	0150	0222	3449	2757	0005343	0100	14610
042		OBS	0153	0219	3449	2757			14609
		STD	0200	0227	3457	2763	0004829	0125	14622
042		OBS	T0204	0228	3458	2763			14623
		STD	0250	0270	3468	2768	0004400	0148	14650
		STD	0300	0305	3476	2771	0004156	0170	14674
042		OBS	0307	0309	3477	2771			14677
		STD	0400	0339	3485	2775	0003893	0210	14707
042		OBS	0409	0341	3486	2776			14709
		STD	0500	0344	3488	2777	0003814	0248	14726
		STD	0600	0347	3490	2778	0003785	0286	14744
042		OBS	T0616	0347	3490	2778			14747
		STD	0700	0346	3490	2778	0003868	0325	14760
		STD	0800	0344	3489	2778	0003970	0364	14776
042		OBS	0819	0344	3489	2778			14779
		STD	0900	0344	3490	2779	0003966	0403	14793
		STD	1000	0344	3492	2780	0003936	0443	14809
042		OBS	T1021	0344	3492	2780			14813
		STD	1100	0343	3492	2780	0004019	0483	14826
		STD	1200	0341	3491	2780	0004111	0523	14842
		STD	1300	0338	3490	2779	0004197	0565	14857
		STD	1400	0335	3490	2779	0004281	0607	14873
		STD	1500	0331	3489	2779	0004351	0650	14888
042		OBS	T1533	0329	3489	2779			14892

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4920 N	04620 W		149	96	05	27	072	1963		8651	3100	16

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F02		078			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0628	3461	2723	0008491	0000	14757
077		OBS	0000	0628	3461	2723			14757
		STD	0010	0619	3461	2724	0008397	0008	14755
		STD	0020	0610	3460	2724	0008376	0017	14753
077		OBS	0026	0605	3459	2724			14752
		STD	0030	0583	3458	2726	0008217	0025	14743
		STD	0050	0500	3453	2732	0007689	0041	14712
077		OBS	0052	0494	3452	2732			14710
		STD	0075	0461	3458	2741	0006879	0059	14701
077		OBS	0078	0452	3459	2743			14698
		STD	0100	0338	3461	2756	0005442	0075	14654
077		OBS	0105	0324	3462	2758			14649
		STD	0125	0378	3475	2763	0004797	0087	14677
		STD	0150	0420	3486	2768	0004424	0099	14700
077		OBS	0156	0425	3488	2769			14703
		STD	0200	0403	3488	2771	0004147	0120	14701
077		OBS	T0208	0400	3488	2771			14701
		STD	0250	0383	3487	2772	0004047	0141	14701
		STD	0300	0371	3486	2773	0004037	0161	14704
077		OBS	0313	0369	3486	2773			14705
		STD	0400	0373	3489	2774	0003985	0201	14722
077		OBS	0417	0374	3489	2775			14725
		STD	0500	0370	3489	2775	0004003	0241	14737
		STD	0600	0364	3489	2776	0004026	0281	14751
077		OBS	T0627	0363	3489	2776			14755
		STD	0700	0359	3490	2777	0004005	0321	14766
		STD	0800	0354	3491	2778	0003960	0361	14780
077		OBS	0833	0353	3491	2778			14785
		STD	0900	0351	3490	2778	0004031	0401	14796
		STD	1000	0349	3489	2778	0004164	0442	14811
077		OBS	T1037	0348	3489	2777			14817
		STD	1100	0347	3489	2778	0004221	0484	14827
		STD	1200	0345	3490	2778	0004240	0526	14843
		STD	1300	0344	3491	2779	0004263	0569	14860
		STD	1400	0343	3491	2779	0004285	0612	14876
		STD	1500	0342	3492	2780	0004306	0655	14893
077		OBS	T1556	0342	3492	2780			14902

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48595N	04642 W		149	86	05	27	102	1963		8652	2740	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		20	F03		081			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0622	3459	2722	0008567	0000	14754
107	OBS	0000	0622	3459	2722			14754
	STD	0010	0585	3459	2727	0008131	0008	14741
	STD	0020	0558	3459	2730	0007825	0016	14732
107	OBS	0024	0550	3459	2731			14729
	STD	0030	0547	3459	2732	0007708	0024	14729
	STD	0050	0536	3459	2733	0007609	0039	14728
107	OBS	0050	0536	3459	2733			14728
107	OBS	0074	0447	3459	2743			14695
	STD	0075	0445	3460	2744	0006559	0057	14694
107	OBS	0099	0404	3471	2757			14683
	STD	0100	0402	3471	2758	0005314	0072	14682
	STD	0125	0356	3472	2763	0004844	0085	14667
107	OBS	0148	0336	3472	2765			14662
	STD	0150	0338	3473	2766	0004580	0096	14663
107	OBS	T0198	0369	3483	2770			14686
	STD	0200	0369	3483	2771	0004168	0118	14686
	STD	0250	0371	3485	2772	0004083	0139	14696
107	OBS	0297	0373	3487	2773			14704
	STD	0300	0373	3487	2773	0003998	0159	14705
107	OBS	0395	0370	3489	2775			14720
	STD	0400	0370	3489	2775	0003914	0199	14720
	STD	0500	0362	3488	2775	0003992	0238	14733
107	OBS	T0593	0357	3487	2775			14747
	STD	0600	0357	3487	2775	0004099	0279	14748
	STD	0700	0355	3488	2775	0004125	0320	14764
107	OBS	0788	0352	3488	2776			14777
	STD	0800	0351	3488	2776	0004127	0361	14779
	STD	0900	0348	3488	2777	0004175	0403	14794
107	OBS	T0981	0345	3488	2777			14806
	STD	1000	0345	3488	2777	0004205	0444	14809
	STD	1100	0345	3489	2778	0004221	0487	14826
	STD	1200	0344	3490	2778	0004237	0529	14843
	STD	1300	0344	3491	2779	0004252	0571	14859
	STD	1400	0343	3491	2780	0004266	0614	14876
107	OBS	T1478	0343	3492	2780			14889

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48385N	04701 W		149	87	05	27	138	1963		8653	2520	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F02		085			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0552	3447	2722	0008629	0000	14724
142		OBS	0000	0552	3447	2722			14724
		STD	0010	0527	3447	2725	0008356	0008	14716
		STD	0020	0499	3447	2728	0008056	0017	14706
142		OBS	0024	0487	3447	2729			14702
		STD	0030	0464	3448	2732	0007651	0025	14693
142		OBS	0049	0403	3449	2740			14671
		STD	0050	0401	3449	2740	0006880	0039	14670
142		OBS	0074	0355	3460	2754			14656
		STD	0075	0353	3461	2755	0005563	0055	14656
142		OBS	0099	0311	3471	2767			14643
		STD	0100	0311	3471	2767	0004436	0067	14644
		STD	0125	0323	3475	2768	0004288	0078	14653
142		OBS	0148	0333	3478	2770			14662
		STD	0150	0334	3478	2770	0004158	0089	14662
142		OBS	T0198	0351	3481	2771			14678
		STD	0200	0351	3481	2771	0004140	0109	14678
		STD	0250	0356	3484	2772	0004034	0130	14689
142		OBS	0296	0360	3486	2774			14699
		STD	0300	0360	3486	2774	0003934	0150	14699
142		OBS	0393	0365	3490	2776			14717
		STD	0400	0365	3490	2776	0003787	0188	14718
		STD	0500	0361	3489	2776	0003907	0227	14733
142		OBS	T0584	0358	3488	2776			14746
		STD	0600	0357	3488	2776	0004017	0266	14748
		STD	0700	0352	3489	2777	0004010	0307	14762
142		OBS	0792	0349	3489	2777			14777
		STD	0800	0349	3489	2777	0004028	0347	14778
		STD	0900	0347	3490	2778	0004047	0387	14794
		STD	1000	0344	3490	2778	0004064	0428	14809
142		OBS	T1007	0344	3490	2779			14810
		STD	1100	0344	3490	2779	0004114	0469	14826
		STD	1200	0344	3491	2779	0004167	0510	14843
		STD	1300	0345	3491	2779	0004219	0552	14860
		STD	1400	0345	3492	2780	0004278	0594	14877
		STD	1500	0345	3492	2780	0004329	0637	14894
142		OBS	T1516	0345	3492	2780			14897

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48165N	04719 W		149	87	05	27	173	1963		8654	1540	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F02		086			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0548	3409	2692	0011429	0000	14718
178	OBS	0000	0548	3409	2692			14718
	STD	0010	0473	3410	2701	0010540	0011	14689
	STD	0020	0413	3414	2711	0009633	0021	14666
178	OBS	0025	0388	3416	2715			14656
	STD	0030	0374	3421	2721	0008735	0030	14652
	STD	0050	0322	3438	2739	0006989	0046	14635
178	OBS	0052	0317	3439	2740			14634
	STD	0075	0263	3454	2757	0005285	0061	14616
178	OBS	0077	0261	3455	2758			14616
	STD	0100	0280	3464	2764	0004692	0074	14629
178	OBS	0103	0282	3465	2764			14631
	STD	0125	0294	3466	2764	0004689	0086	14639
	STD	0150	0308	3467	2763	0004766	0097	14650
178	OBS	0154	0310	3467	2763			14651
	STD	0200	0339	3476	2768	0004404	0120	14672
178	OBS	T0205	0341	3477	2768			14674
	STD	0250	0353	3481	2770	0004246	0142	14687
	STD	0300	0362	3485	2772	0004080	0163	14700
178	OBS	0307	0363	3485	2773			14702
	STD	0400	0368	3484	2771	0004255	0204	14719
178	OBS	0408	0368	3484	2771			14720
	STD	0500	0369	3487	2773	0004159	0246	14736
	STD	0600	0369	3490	2776	0004029	0287	14753
178	OBS	T0610	0369	3490	2776			14755
	STD	0700	0367	3489	2776	0004136	0328	14769
	STD	0800	0364	3488	2775	0004269	0370	14784
178	OBS	0810	0364	3488	2775			14786
	STD	0900	0360	3488	2775	0004311	0413	14799
	STD	1000	0355	3488	2776	0004341	0456	14814
178	OBS	T1007	0355	3488	2776			14815
	STD	1100	0352	3488	2776	0004384	0500	14829
	STD	1200	0349	3488	2776	0004428	0544	14845
	STD	1300	0347	3488	2777	0004483	0589	14861
	STD	1400	0346	3488	2777	0004550	0634	14877
	STD	1500	0346	3488	2777	0004627	0680	14894
178	OBS	T1515	0346	3488	2777			14896

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4756 N	04738 W		149	77	05	27	202	1963		8655	0355	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F02		083			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0470	3319	2630	0017335	0000	14674
205		OBS	0000	0470	3319	2630			14674
		STD	0010	0345	3319	2642	0016141	0017	14622
		STD	0020	0240	3319	2651	0015278	0032	14579
205		OBS	0025	0194	3319	2655			14559
		STD	0030	0145	3330	2667	0013774	0047	14540
		STD	0050	0039	3368	2704	0010259	0071	14501
205		OBS	0050	0039	3368	2704			14501
		STD	0075	0103	3399	2725	0008272	0094	14538
205		OBS	0075	0103	3399	2725			14538
		STD	0100	0178	3415	2733	0007575	0114	14578
205		OBS	0100	0178	3415	2733			14578
		STD	0125	0191	3427	2742	0006774	0132	14589
		STD	0150	0208	3436	2747	0006236	0148	14602
205		OBS	0150	0208	3436	2747			14602
		STD	0200	0251	3448	2753	0005724	0178	14631
205		OBS	0201	0252	3448	2753			14631
		STD	0250	0286	3458	2758	0005311	0206	14656
		STD	0300	0315	3468	2764	0004867	0231	14678
205		OBS	T0301	0316	3468	2764			14678
205		OBS	T0343	0336	3471	2764			14694

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4748 N	04749 W		149	77	05	27	197	1963		8656	0295	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		18	F02		055			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0453	3315	2628	0017462	0000	14666
219		OBS	0000	0453	3315	2628			14666
		STD	0010	0359	3315	2638	0016538	0017	14628
		STD	0020	0272	3316	2646	0015771	0033	14592
219		OBS	0026	0222	3316	2651			14571
		STD	0030	0179	3319	2656	0014837	0048	14554
		STD	0050	0042	3337	2679	0012636	0076	14498
219		OBS	0051	0038	3338	2680			14496
		STD	0075	0053	3362	2699	0010789	0105	14510
219		OBS	0076	0054	3363	2699			14511
		STD	0100	0077	3385	2716	0009178	0130	14529
219		OBS	0102	0079	3387	2717			14530
		STD	0125	0123	3403	2727	0008106	0152	14556
		STD	0150	0164	3417	2736	0007338	0171	14580
219		OBS	0153	0168	3419	2737			14583
		STD	0200	0221	3440	2750	0006061	0205	14617
219		OBS	T0204	0225	3441	2750			14619
		STD	0250	0266	3454	2757	0005417	0233	14646
219		OBS	T0284	0290	3460	2760			14663

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4743 N	04812 W		149	78	05	27	238	1963		8657	0238	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		22	F02		042			

MESSENGER TIME HR 1/10 or CAST NO	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0344	3291	2620	0018240	0000	14617
241	OBS	0000	0344	3291	2620			14617
	STD	0010	0271	3292	2627	0017559	0018	14587
	STD	0020	0194	3294	2635	0016836	0035	14555
241	OBS	0025	0154	3295	2639			14538
	STD	0030	0100	3297	2644	0016005	0052	14515
	STD	0050	-0062	3304	2657	0014687	0082	14445
241	OBS	0050	-0062	3304	2657			14445
	STD	0075	-0142	3313	2667	0013722	0118	14413
241	OBS	0075	-0142	3313	2667			14413
	STD	0100	-0078	3331	2680	0012538	0151	14450
241	OBS	0100	-0078	3331	2680			14450
	STD	0125	0035	3365	2702	0010458	0179	14511
	STD	0150	0117	3390	2717	0009055	0204	14555
241	OBS	0150	0117	3390	2717			14555
	STD	0200	0163	3416	2735	0007424	0245	14588
241	OBS	T0220	0182	3418	2735			14600

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4739 N	04828 W		149	78	05	26	012	1963		8658	0210	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		041			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0346	3283	2614	0018861	0000	14616
016	OBS	0000	0346	3283	2614			14616
	STD	0010	0276	3284	2621	0018189	0019	14588
	STD	0020	0209	3285	2627	0017594	0036	14561
016	OBS	0025	0177	3286	2630			14547
	STD	0030	0148	3290	2635	0016832	0054	14536
	STD	0050	0025	3302	2652	0015217	0086	14485
016	OBS	0050	0025	3302	2652			14485
	STD	0075	-0146	3312	2667	0013788	0122	14411
016	OBS	0075	-0146	3312	2667			14411
	STD	0100	-0081	3328	2677	0012756	0155	14448
016	OBS	0100	-0081	3328	2677			14448
	STD	0125	0016	3355	2695	0011271	0185	14500
	STD	0150	0085	3374	2706	0010064	0212	14539
016	OBS	0150	0085	3374	2706			14539
	STD	0200	0141	3401	2724	0008396	0258	14576
016	OBS	T0200	0141	3401	2724			14576

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4740 N	04858 W		149	78	05	28	039	1963		8659	0168	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		033			

MESSENGER TIME HR 1/10 or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0322	3279	2613	0018956	0000	14606
042	OBS	0000	0322	3279	2613			14606
	STD	0010	0267	3280	2618	0018451	0019	14584
	STD	0020	0199	3281	2624	0017887	0037	14555
042	OBS	0025	0161	3281	2627			14539
	STD	0030	0098	3284	2633	0017005	0054	14512
	STD	0050	-0082	3295	2650	0015342	0087	14435
042	OBS	0051	-0088	3295	2651			14432
	STD	0075	-0146	3304	2660	0014402	0124	14410
042	OBS	0076	-0147	3305	2661			14410
	STD	0100	-0119	3320	2672	0013238	0158	14429
042	OBS	0101	-0117	3321	2673			14430
	STD	0125	-0045	3343	2688	0011744	0190	14471
	STD	0150	0076	3372	2705	0010161	0217	14535
042	OBS	T0152	0086	3375	2707			14541

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4752 N	048485W		149	78	05	28	055	1963		8660	0220	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		20	F03		034			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0334	3284	2616	0018681	0000	14611
058	OBS	0000	0334	3284	2616			14611
	STD	0010	0265	3286	2623	0017996	0018	14583
	STD	0020	0186	3287	2630	0017296	0036	14551
058	OBS	0025	0143	3288	2634			14532
	STD	0030	0076	3292	2641	0016249	0053	14504
	STD	0050	-0107	3304	2659	0014531	0084	14424
058	OBS	0050	-0107	3304	2659			14424
	STD	0075	-0141	3311	2665	0013902	0119	14414
058	OBS	0076	-0142	3311	2666			14413
	STD	0100	-0125	3321	2673	0013142	0153	14427
058	OBS	0101	-0124	3322	2674			14427
	STD	0125	-0055	3343	2689	0011702	0184	14466
	STD	0150	0013	3362	2701	0010566	0212	14504
058	OBS	0152	0018	3364	2702			14507
	STD	0200	0136	3398	2722	0008588	0260	14573
058	OBS	T0202	0141	3399	2723			14576

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48055N	04840 W		149	88	05	28	072	1963		8661	0322	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
	.	20	F02		061			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0314	3299	2629	0017377	0000	14605
074	OBS	0000	0314	3299	2629			14605
	STD	0010	0219	3301	2639	0016482	0017	14565
	STD	0020	0128	3303	2647	0015717	0033	14527
074	OBS	0025	0085	3304	2650			14509
	STD	0030	0026	3305	2655	0014967	0048	14483
	STD	0050	-0115	3311	2665	0013970	0077	14422
074	OBS	0050	-0115	3311	2665			14422
	STD	0075	-0072	3339	2686	0011960	0110	14450
074	OBS	0076	-0069	3340	2687			14451
	STD	0100	0024	3365	2703	0010403	0138	14502
074	OBS	0101	0027	3366	2703			14503
	STD	0125	0098	3385	2714	0009309	0162	14542
	STD	0150	0157	3405	2727	0008195	0184	14575
074	OBS	0152	0161	3406	2727			14578
	STD	0200	0231	3440	2749	0006144	0220	14621
074	OBS	0202	0233	3441	2749			14622
	STD	0250	0275	3460	2761	0005047	0248	14651
	STD	0300	0292	3463	2762	0005010	0273	14667
074	OBS	T0303	0292	3463	2762			14668

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4813 N	04838 W		149	88	05	28	083	1963		8662	0658	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		16	F04		047			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0355	3308	2633	0017054	0000	14624
086	OBS	0000	0355	3308	2633			14624
	STD	0010	0266	3310	2642	0016158	0017	14587
	STD	0020	0201	3312	2649	0015520	0032	14561
086	OBS	0025	0177	3313	2651			14551
	STD	0030	0164	3323	2660	0014431	0047	14547
086	OBS	0049	0146	3357	2689			14547
	STD	0050	0149	3359	2690	0011602	0073	14549
086	OBS	0074	0202	3394	2714			14581
	STD	0075	0203	3395	2715	0009266	0100	14582
086	OBS	0098	0217	3414	2729			14594
	STD	0100	0216	3415	2730	0007864	0121	14595
	STD	0125	0206	3425	2739	0007038	0140	14595
086	OBS	0148	0196	3434	2747			14596
	STD	0150	0200	3435	2747	0006249	0156	14598
086	OBS	T0197	0267	3453	2756			14638
	STD	0200	0268	3453	2756	0005450	0185	14639
	STD	0250	0283	3461	2761	0005074	0212	14655
086	OBS	0294	0300	3467	2764			14670
	STD	0300	0303	3468	2765	0004738	0236	14672
086	OBS	0391	0346	3478	2769			14707
	STD	0400	0349	3479	2769	0004444	0282	14710
	STD	0500	0373	3486	2772	0004259	0326	14738
086	OBS	T0582	0375	3488	2774			14753

731–298 O—64——20

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48295N	04826 W		149	88	05	28	105	1963		8663	1760	10

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		20	F02		060			

MESSENGER TIME HR 1/10	CAST OR NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0434	3366	2671	0013435	0000	14665
109		OBS	0000	0434	3366	2671			14665
		STD	0010	0298	3379	2694	0011204	0012	14610
		STD	0020	0207	3391	2712	0009577	0023	14574
109		OBS	0025	0178	3396	2716			14563
		STD	0030	0184	3402	2722	0008577	0032	14567
		STD	0050	0206	3418	2733	0007537	0048	14582
109		OBS	0051	0207	3419	2734			14583
		STD	0075	0153	3423	2741	0006799	0066	14564
109		OBS	0076	0151	3423	2741			14563
		STD	0100	0207	3436	2747	0006243	0082	14593
109		OBS	0101	0209	3436	2747			14594
		STD	0125	0239	3445	2752	0005824	0097	14613
		STD	0150	0263	3454	2757	0005361	0111	14629
109		OBS	0151	0264	3454	2757			14629
		STD	0200	0289	3464	2763	0004869	0137	14649
109		OBS	T0202	0290	3464	2763			14650
		STD	0250	0312	3472	2767	0004523	0160	14669
		STD	0300	0331	3479	2771	0004152	0182	14686
109		OBS	0304	0332	3480	2772			14687
		STD	0400	0354	3485	2773	0004062	0223	14713
109		OBS	0405	0355	3485	2773			14714
		STD	0500	0356	3487	2775	0004010	0263	14731
		STD	0600	0357	3489	2776	0003964	0303	14748
109		OBS	T0610	0357	3489	2776			14750
		STD	0700	0355	3489	2776	0004041	0343	14764
		STD	0800	0352	3488	2776	0004134	0384	14779
109		OBS	0811	0352	3488	2776			14781
		STD	0900	0349	3489	2777	0004112	0425	14795
		STD	1000	0346	3490	2778	0004085	0466	14810
109		OBS	T1011	0346	3490	2778			14812

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4853 N	04812 W		149	88	05	28	133	1963		8664	2260	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		16	F03		078			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0633	3454	2717	0009076	0000	14758
138		OBS	0000	0633	3454	2717			14758
		STD	0010	0591	3457	2725	0008353	0009	14743
		STD	0020	0565	3460	2730	0007833	0017	14735
138		OBS	0024	0558	3461	2732			14733
		STD	0030	0565	3462	2732	0007696	0025	14737
138		OBS	0048	0569	3464	2733			14741
		STD	0050	0569	3464	2733	0007613	0040	14742
138		OBS	0073	0531	3465	2738			14730
		STD	0075	0518	3465	2740	0006977	0058	14725
138		OBS	0098	0410	3466	2753			14684
		STD	0100	0409	3467	2754	0005686	0074	14684
		STD	0125	0402	3476	2761	0004963	0087	14687
138		OBS	0147	0398	3481	2766			14689
		STD	0150	0398	3481	2766	0004549	0099	14690
138		OBS	T0196	0396	3486	2770			14697
		STD	0200	0395	3486	2770	0004206	0121	14698
		STD	0250	0380	3487	2773	0004024	0142	14700
138		OBS	0295	0370	3488	2774			14703
		STD	0300	0369	3488	2775	0003882	0161	14703
138		OBS	0393	0360	3489	2776			14715
		STD	0400	0360	3489	2776	0003810	0200	14716
		STD	0500	0359	3489	2776	0003923	0238	14732
138		OBS	T0591	0357	3488	2776			14746
		STD	0600	0356	3488	2776	0004014	0278	14747
		STD	0700	0351	3489	2777	0003999	0318	14762
138		OBS	0785	0348	3489	2777			14775
		STD	0800	0348	3489	2777	0004026	0358	14777
		STD	0900	0345	3488	2777	0004111	0399	14793
138		OBS	T0978	0343	3488	2777			14805
		STD	1000	0343	3488	2777	0004183	0441	14809
		STD	1100	0343	3489	2778	0004186	0482	14825
		STD	1200	0343	3490	2779	0004189	0524	14842
		STD	1300	0342	3491	2780	0004192	0566	14859
		STD	1400	0342	3492	2780	0004194	0608	14876
138		OBS	T1477	0342	3493	2781			14889

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4916 N	04758 W		149	97	05	28	166	1963		8665	2380	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F02		068			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0692	3463	2716	0009158	C000	14783
170	OBS	0000	0692	3463	2716			14783
	STD	0010	0638	3463	2723	0008511	0009	14763
	STD	0020	0597	3462	2728	0008050	0017	14748
170	OBS	0024	0585	3462	2729			14744
	STD	0030	0576	3462	2730	0007841	0025	14741
170	OBS	0048	0557	3461	2732			14736
	STD	0050	0557	3461	2732	0007682	0041	14736
170	OBS	0072	0551	3463	2734			14738
	STD	0075	0548	3463	2735	0007473	0060	14737
170	OBS	0096	0517	3464	2739			14728
	STD	0100	0502	3465	2742	0006833	0077	14723
	STD	0125	0425	3469	2753	0005726	0093	14695
170	OBS	0144	0390	3472	2760			14684
	STD	0150	0390	3474	2761	0005016	0107	14686
170	OBS	T0192	0391	3482	2767			14694
	STD	0200	0388	3483	2769	0004366	0130	14694
	STD	0250	0375	3485	2771	0004130	0151	14697
170	OBS	0288	0370	3487	2774			14702
	STD	0300	0372	3487	2773	0003980	0172	14704
170	OBS	0384	0379	3489	2774			14722
	STD	0400	0378	3489	2774	0003998	0211	14724
	STD	0500	0371	3489	2775	0004014	0251	14737
170	OBS	T0575	0366	3489	2776			14748
	STD	0600	0364	3489	2776	0004019	0292	14751
	STD	0700	0358	3490	2777	0004002	0332	14765
170	OBS	0768	0354	3490	2778			14775
	STD	0800	0352	3490	2777	0004012	0372	14779
	STD	0900	0347	3489	2777	0004119	0412	14794
170	OBS	T0962	0345	3488	2777			14803
	STD	1000	0345	3488	2777	0004206	0454	14809
	STD	1100	0345	3489	2777	0004257	0496	14826
	STD	1200	0345	3489	2778	0004307	0539	14843
	STD	1300	0345	3489	2778	0004356	0583	14860
	STD	1400	0345	3490	2778	0004405	0626	14877
170	OBS	T1454	0345	3490	2778			14886

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4941 N	047415W		149	97	05	28	197	1963		8666	2630	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F04		071			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0607	3457	2723	0008532	0000	14748
202		OBS	0000	0607	3457	2723			14748
		STD	0010	0544	3457	2730	0007800	0008	14724
		STD	0020	0497	3457	2736	0007284	0016	14707
202		OBS	0024	0483	3457	2738			14701
		STD	0030	0482	3457	2738	0007146	0023	14702
		STD	0050	0453	3456	2740	0006918	0037	14693
202		OBS	0050	0453	3456	2740			14693
202		OBS	0074	0371	3461	2753			14663
		STD	0075	0369	3461	2753	0005693	0053	14663
		STD	0100	0328	3469	2763	0004747	0066	14650
202		OBS	0100	0328	3469	2763			14650
		STD	0125	0327	3472	2766	0004531	0077	14654
202		OBS	0149	0326	3476	2769			14659
		STD	0150	0327	3476	2769	0004235	0088	14659
202		OBS	T0199	0360	3485	2773			14682
		STD	0200	0360	3485	2773	0003936	0109	14683
		STD	0250	0370	3487	2774	0003920	0128	14695
202		OBS	0298	0379	3489	2774			14707
		STD	0300	0378	3489	2774	0003907	0148	14707
202		OBS	0395	0353	3486	2774			14712
		STD	0400	0353	3486	2774	0003962	0187	14713
		STD	0500	0351	3486	2775	0004025	0227	14729
202		OBS	T0589	0349	3486	2775			14742
		STD	0600	0349	3486	2775	0004088	0268	14744
		STD	0700	0347	3485	2775	0004193	0309	14760
202		OBS	0787	0345	3485	2774			14773
		STD	0800	0345	3485	2775	0004260	0352	14776
		STD	0900	0342	3487	2777	0004158	0394	14791
202		OBS	T0987	0341	3489	2778			14806
		STD	1000	0341	3489	2778	0004095	0435	14808
		STD	1100	0341	3490	2779	0004133	0476	14825
		STD	1200	0342	3490	2779	0004180	0518	14842
		STD	1300	0342	3491	2779	0004219	0560	14859
		STD	1400	0343	3491	2780	0004258	0602	14876
		STD	1500	0343	3492	2780	0004296	0645	14893
202		OBS	T1503	0343	3492	2780			14894

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4949 N	04822 W		149	98	05	28	228	1963		8667	2370	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS
		22	F03		064			

MESSENGER TIME HR 1/10 or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0655	3463	2721	0008681	0000	14768
233	OBS	0000	0655	3463	2721			14768
	STD	0010	0609	3462	2726	0008182	0008	14751
	STD	0020	0564	3462	2732	0007709	0016	14735
233	OBS	0026	0537	3461	2734			14724
	STD	0030	0521	3461	2736	0007263	0024	14719
	STD	0050	0433	3461	2746	0006333	0037	14685
233	OBS	0051	0428	3461	2747			14684
	STD	0075	0303	3466	2763	0004726	0051	14635
233	OBS	0077	0299	3467	2764			14634
	STD	0100	0327	3473	2767	0004406	0063	14651
233	OBS	0102	0329	3474	2767			14652
	STD	0125	0340	3477	2769	0004262	0074	14661
	STD	0150	0349	3481	2771	0004106	0084	14669
233	OBS	0152	0350	3481	2771			14670
	STD	0200	0360	3485	2773	0003953	0104	14683
233	OBS	T0203	0361	3485	2773			14684
	STD	0250	0362	3486	2774	0003888	0124	14692
	STD	0300	0362	3488	2775	0003825	0143	14700
233	OBS	0305	0362	3488	2775			14701
	STD	0400	0360	3488	2775	0003885	0182	14716
233	OBS	0406	0360	3488	2775			14717
	STD	0500	0356	3488	2776	0003927	0221	14731
	STD	0600	0351	3488	2776	0003964	0260	14746
233	OBS	T0609	0351	3488	2776			14747
	STD	0700	0349	3488	2777	0003990	0300	14761
	STD	0800	0346	3489	2777	0004007	0340	14777
233	OBS	0812	0346	3489	2778			14779
	STD	0900	0343	3489	2778	0004048	0380	14792
	STD	1000	0340	3489	2778	0004094	0421	14808
233	OBS	T1014	0340	3489	2778			14810
	STD	1100	0340	3490	2778	0004135	0462	14824
	STD	1200	0341	3490	2779	0004174	0504	14841
	STD	1300	0341	3491	2779	0004213	0545	14858
	STD	1400	0342	3491	2780	0004251	0588	14875
	STD	1500	0342	3492	2780	0004297	0631	14893
233	OBS	T1520	0342	3492	2780			14897

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	5001 N	04903 W		185	09	05	29	032	1963		8668	1730	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F02		054			

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0532	3362	2657	0014772	0000	14705
037		OBS	0000	0532	3362	2657			14705
		STD	0010	0501	3411	2699	0010766	0013	14700
		STD	0020	0471	3446	2730	0007827	0022	14694
037		OBS	0024	0460	3455	2739			14692
		STD	0030	0444	3456	2741	0006802	0029	14686
037		OBS	0049	0397	3459	2749			14670
		STD	0050	0394	3459	2749	0006073	0042	14669
037		OBS	0073	0348	3463	2757			14654
		STD	0075	0346	3464	2758	0005271	0056	14653
037		OBS	0097	0332	3472	2765			14652
		STD	0100	0332	3472	2766	0004534	0069	14652
		STD	0125	0331	3475	2768	0004354	0080	14657
037		OBS	0145	0331	3477	2769			14660
		STD	0150	0333	3478	2770	0004156	0090	14662
037		OBS	T0194	0346	3482	2772			14675
		STD	0200	0347	3483	2773	0003957	0111	14677
		STD	0250	0356	3486	2774	0003863	0130	14689
037		OBS	0292	0361	3488	2775			14699
		STD	0300	0361	3488	2775	0003806	0149	14700
037		OBS	0390	0362	3488	2775			14715
		STD	0400	0362	3488	2775	0003898	0188	14717
		STD	0500	0358	3489	2776	0003868	0227	14732
037		OBS	T0588	0355	3490	2777			14745
		STD	0600	0354	3490	2777	0003851	0265	14747
		STD	0700	0349	3489	2777	0003955	0304	14761
037		OBS	0784	0346	3488	2777			14774
		STD	0800	0346	3488	2777	0004063	0345	14777
		STD	0900	0344	3489	2777	0004085	0385	14792
037		OBS	T0980	0343	3489	2778			14805
		STD	1000	0343	3489	2778	0004117	0426	14809
		STD	1100	0343	3490	2778	0004167	0468	14826
		STD	1200	0343	3490	2779	0004216	0510	14842
		STD	1300	0343	3490	2779	0004265	0552	14859
		STD	1400	0343	3491	2779	0004314	0595	14876
037		OBS	T1486	0343	3491	2779			14891

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4935 N	04914 W		149	99	05	29	066	1963		8669	1536	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F02		056			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0387	3284	2611	0019156	0000	14634
072		OBS	0000	0387	3284	2611			14634
		STD	0010	0315	3351	2671	0013464	0016	14614
		STD	0020	0267	3398	2712	0009516	0028	14601
072		OBS	0021	0264	3402	2716			14601
		STD	0030	0263	3415	2726	0008204	0037	14603
072		OBS	0047	0261	3433	2741			14608
		STD	0050	0259	3435	2742	0006671	0052	14608
072		OBS	0073	0257	3447	2752			14612
		STD	0075	0259	3448	2753	0005704	0067	14614
072		OBS	0099	0280	3458	2759			14628
		STD	0100	0280	3458	2759	0005132	0081	14628
		STD	0125	0289	3464	2763	0004778	0093	14637
		STD	0150	0297	3470	2767	0004425	0104	14645
072		OBS	0150	0297	3470	2767			14645
		STD	0200	0330	3477	2769	0004266	0126	14669
072		OBS	T0202	0331	3477	2769			14670
		STD	0250	0353	3481	2770	0004231	0147	14687
		STD	0300	0364	3485	2772	0004100	0168	14701
072		OBS	0306	0365	3485	2772			14702
		STD	0400	0351	3486	2775	0003949	0208	14712
072		OBS	0409	0350	3486	2775			14713
		STD	0500	0353	3487	2775	0003979	0248	14729
		STD	0600	0356	3488	2776	0004032	0288	14748
072		OBS	T0620	0357	3488	2776			14751
		STD	0700	0352	3488	2776	0004084	0329	14762
		STD	0800	0348	3487	2776	0004160	0370	14777
072		OBS	0824	0347	3487	2776			14781
		STD	0900	0346	3487	2776	0004220	0412	14793
		STD	1000	0344	3487	2776	0004279	0454	14809
072		OBS	T1030	0343	3487	2776			14813
		STD	1100	0343	3487	2776	0004330	0497	14825
		STD	1200	0343	3488	2777	0004382	0541	14842
		STD	1300	0344	3488	2777	0004433	0585	14859
		STD	1400	0344	3489	2777	0004484	0630	14876
		STD	1500	0344	3489	2778	0004535	0675	14893
072		OBS	T1536	0344	3489	2778			14899

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	49135N	04920 W		149	99	05	29	095	1963		8670	1570	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		16	F03		068			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0435	3339	2649	0015476	0000	14662
100		OBS	0000	0435	3339	2649			14662
		STD	0010	0327	3341	2662	0014322	0015	14618
		STD	0020	0259	3351	2675	0013005	0029	14591
100		OBS	0025	0240	3360	2684			14585
		STD	0030	0259	3380	2699	0010817	0040	14597
		STD	0050	0293	3436	2740	0006883	0058	14623
100		OBS	0050	0293	3436	2740			14623
		STD	0075	0241	3446	2752	0005737	0074	14605
100		OBS	0076	0240	3446	2753			14605
		STD	0100	0262	3456	2759	0005171	0088	14620
100		OBS	0101	0263	3456	2759			14621
		STD	0125	0272	3459	2761	0004993	0100	14629
		STD	0150	0283	3463	2762	0004849	0113	14638
100		OBS	0152	0284	3463	2763			14639
		STD	0200	0313	3470	2765	0004638	0136	14660
100		OBS	T0203	0315	3470	2765			14662
		STD	0250	0342	3477	2768	0004437	0159	14682
		STD	0300	0362	3483	2771	0004162	0180	14700
100		OBS	0304	0363	3484	2772			14701
		STD	0400	0372	3485	2772	0004246	0223	14721
100		OBS	0406	0373·	3485	2772			14722
		STD	0500	0369	3487	2774	0004147	0265	14736
		STD	0600	0364	3489	2776	0004045	0305	14751
100		OBS	T0608	0364	3489	2776			14752
		STD	0700	0360	3489	2776	0004105	0346	14766
		STD	0800	0355	3488	2776	0004176	0388	14780
100		OBS	0808	0355	3488	2776			14782
		STD	0900	0351	3489	2777	0004175	0429	14795
		STD	1000	0347	3489	2777	0004173	0471	14810
100		OBS	T1005	0347	3489	2777			14811
		STD	1100	0346	3490	2778	0004166	0513	14827
		STD	1200	0345	3490	2778	0004234	0555	14843
		STD	1300	0344	3491	2779	0004227	0597	14860
		STD	1400	0343	3491	2779	0004293	0640	14876
		STD	1500	0342	3492	2780	0004285	0683	14893
100		OBS	T1507	0342	3492	2780			14894

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4850 N	049295W		149	89	05	29	126	1963		8671	1390	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		16	F02		068			

MESSENGER TIME HR 1/10	or CAST NO	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0380	3308	2630	0017282	0000	14634
130		OBS	0000	0380	3308	2630			14634
		STD	0010	0311	3311	2639	0016466	0017	14607
		STD	0020	0234	3314	2648	0015641	0033	14575
130		OBS	0025	0194	3315	2652			14559
		STD	0030	0121	3321	2662	0014306	0048	14528
		STD	0050	-0033	3348	2692	0011439	0074	14465
130		OBS	0050	-0033	3348	2692			14465
		STD	0075	0090	3385	2715	0009255	0100	14530
130		OBS	0076	0094	3386	2716			14532
		STD	0100	0148	3407	2729	0007967	0121	14563
130		OBS	0101	0150	3408	2729			14565
		STD	0125	0179	3421	2738	0007138	0140	14583
		STD	0150	0205	3433	2745	0006439	0157	14600
130		OBS	0152	0207	3434	2746			14602
		STD	0200	0247	3452	2757	0005374	0186	14630
130		OBS	T0202	0249	3453	2758			14631
		STD	0250	0308	3468	2764	0004749	0212	14666
139		OBS	T0297	0348	3478	2769			14693
		STD	0300	0349	3478	2769	0004420	0235	14694
139		OBS	0398	0371	3486	2773			14720
		STD	0400	0371	3486	2773	0004150	0278	14720
		STD	0500	0377	3488	2773	0004185	0319	14739
		STD	0600	0382	3489	2774	0004223	0361	14759
139		OBS	T0601	0382	3489	2774			14759
		STD	0700	0377	3490	2775	0004221	0403	14773
139		OBS	0798	0372	3490	2776			14787
		STD	0800	0372	3490	2776	0004215	0446	14788
		STD	0900	0366	3489	2776	0004307	0488	14802
139		OBS	T0993	0361	3488	2775			14815
		STD	1000	0361	3488	2775	0004407	0532	14816
		STD	1100	0356	3488	2776	0004431	0576	14831
		STD	1200	0351	3488	2776	0004452	0620	14845
		STD	1300	0347	3488	2777	0004483	0665	14861
139		OBS	T1390	0344	3488	2777			14874

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48325N	049335W		149	89	05	29	169	1963		8672	0650	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		16	F01		072			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0429	3289	2610	0019180	0000	14652
163		OBS	0000	0429	3289	2610			14652
		STD	0010	0330	3299	2628	0017519	0018	14613
		STD	0020	0242	3308	2643	0016126	0035	14578
163		OBS	0025	0202	3313	2650			14562
		STD	0030	0159	3317	2656	0014853	0051	14544
		STD	0050	0041	3335	2678	0012783	0078	14497
163		OBS	0051	0037	3336	2679			14495
		STD	0075	0019	3362	2701	0010608	0108	14495
163		OBS	0076	0018	3363	2701			14495
		STD	0100	0081	3383	2714	0009354	0132	14530
163		OBS	0102	0085	3385	2715			14532
		STD	0125	0113	3398	2724	0008419	0155	14551
		STD	0150	0143	3411	2732	0007642	0175	14570
163		OBS	0153	0146	3413	2734			14572
		STD	0200	0198	3434	2747	0006329	0210	14606
163		OBS	T0204	0202	3436	2748			14608
		STD	0250	0252	3451	2756	0005520	0239	14640
		STD	0300	0289	3462	2761	0005057	0266	14666
163		OBS	0305	0292	3463	2762			14668
		STD	0400	0309	3467	2763	0004965	0316	14691
163		OBS	0407	0310	3467	2763			14693
		STD	0500	0332	3475	2768	0004649	0364	14719
		STD	0600	0362	3489	2776	0004005	0407	14750
163		OBS	T0609	0365	3490	2776			14753

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48155N	04938 W		149	89	05	29	182	1963		8673	0225	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		04	F02		065			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0404	3251	2583	0021802	0000	14637
184		OBS	0000	0404	3251	2583			14637
		STD	0010	0287	3262	2602	0019957	0021	14590
		STD	0020	0174	3272	2619	0018368	0040	14543
184		OBS	0026	0108	3278	2628			14516
		STD	0030	0047	3282	2635	0016857	0058	14489
		STD	0050	-0150	3297	2655	0014947	0089	14403
184		OBS	0051	-0155	3298	2655			14401
		STD	0075	-0144	3306	2661	0014277	0126	14411
184		OBS	0076	-0143	3306	2662			14412
		STD	0100	-0120	3310	2664	0014000	0161	14427
184		OBS	0102	-0118	3311	2665			14429
		STD	0125	-0096	3317	2669	0013530	0196	14444
		STD	0150	-0053	3330	2678	0012692	0229	14470
184		OBS	0153	-0046	3332	2679			14474
		STD	0200	0097	3379	2710	0009763	0285	14553
184		OBS	T0204	0113	3384	2713			14562

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4800 N	04947 W		149	89	05	29	201	1963		8674	0170	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		04	F02		049			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0303	3277	2613	0018948	0000	14597
204		OBS	0000	0303	3277	2613			14597
		STD	0010	0251	3279	2619	0018388	0019	14576
		STD	0020	0196	3282	2625	0017760	0037	14554
204		OBS	0026	0161	3283	2629			14540
		STD	0030	0133	3284	2631	0017208	0054	14528
		STD	0050	0010	3288	2641	0016229	0088	14476
204		OBS	0051	0004	3288	2642			14474
		STD	0075	-0111	3307	2662	0014274	0126	14427
204		OBS	0076	-0114	3308	2662			14426
		STD	0100	-0119	3318	2671	0013392	0160	14429
204		OBS	0102	-0119	3319	2671			14429
		STD	0125	-0067	3337	2684	0012111	0192	14460
		STD	0150	0049	3365	2701	0010534	0221	14521
204		OBS	T0153	0067	3369	2703			14531

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4746 N	04952 W		149	79	05	29	220	1963		8675	0115	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		07	F02		047			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0325	3274	2608	0019360	0000	14606
223	OBS	0000	0325	3274	2608			14606
	STD	0010	0253	3281	2620	0018251	0019	14578
	STD	0020	0186	3285	2628	0017463	0037	14550
223	OBS	0025	0155	3287	2632			14538
	STD	0030	0127	3287	2634	0016912	0054	14526
	STD	0050	0019	3288	2641	0016256	0087	14480
223	OBS	0050	0019	3288	2641			14480
	STD	0075	-0101	3316	2668	0013617	0124	14433
223	OBS	0075	-0101	3316	2668			14433
	STD	0100	-0033	3338	2684	0012187	0157	14472
223	OBS	T0100	-0033	3338	2684			14472

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4724 N	05000 W		150	70	05	30	009	1963		8676	0097	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		04	F03		045			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0370	3287	2615	0018774	0000	14627
011	OBS	0000	0370	3287	2615			14627
	STD	0010	0293	3287	2622	0018115	0018	14596
	STD	0020	0224	3287	2627	0017582	0036	14567
	STD	0030	0162	3287	2632	0017151	0054	14542
011	OBS	0030	0162	3287	2632			14542
	STD	0050	0060	3293	2643	0016083	0087	14500
011	OBS	0060	0024	3301	2651			14486
	STD	0075	-0010	3319	2667	0013747	0124	14476
011	OBS	T0090	-0020	3343	2687			14477

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47345N	05024 W		150	70	05	30	032	1963		8677	0125	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F03		044			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0322	3279	2613	0018956	0000	14606
034		OBS	0000	0322	3279	2613			14606
		STD	0010	0266	3280	2618	0018451	0019	14583
		STD	0020	0209	3280	2623	0017981	0037	14560
		STD	0030	0150	3281	2628	0017528	0055	14535
034		OBS	0030	0150	3281	2628			14535
		STD	0050	0007	3288	2642	0016199	0088	14475
034		OBS	0059	-0028	3296	2650			14461
		STD	0075	-0025	3324	2672	0013299	0125	14469
034		OBS	0088	-0021	3338	2683			14475
		STD	0100	-0017	3340	2685	0012106	0157	14479
034		OBS	T0118	-0009	3343	2687			14486

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4745 N	050455W		150	70	05	30	050	1963		8678	0115	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F04		040			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0313	3277	2612	0019032	0000	14601
053		OBS	0000	0313	3277	2612			14601
		STD	0010	0248	3277	2617	0018516	0019	14575
		STD	0020	0185	3277	2622	0018063	0037	14549
053		OBS	0024	0161	3277	2624			14539
		STD	0030	0123	3279	2628	0017534	0055	14523
053		OBS	0048	0026	3284	2637			14483
		STD	0050	0012	3285	2639	0016452	0089	14477
053		OBS	0072	-0064	3307	2660			14448
		STD	0075	-0055	3311	2663	0014165	0127	14453
053		OBS	T0096	0005	3348	2690			14490

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47525N	05102 W		150	71	05	30	069	1963		8679	0120	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		07	F04		039			

MESSENGER TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10[7]	Σ ΔD DYN. M. X 10[3]	SOUND VELOCITY
		STD	0000	0312	3273	2609	0019325	0000	14600
072		OBS	0000	0312	3273	2609			14600
		STD	0010	0243	3273	2615	0018751	0019	14572
		STD	0020	0183	3274	2620	0018292	0038	14547
072		OBS	0025	0156	3274	2622			14536
		STD	0030	0140	3276	2624	0017852	0056	14530
		STD	0050	0053	3284	2636	0016762	0090	14495
072		OBS	0051	0048	3284	2636			14493
		STD	0075	-0117	3296	2654	0014945	0130	14423
072		OBS	0076	-0119	3299	2655			14422
		STD	0100	-0055	3332	2680	0012551	0164	14461
072		OBS	T0101	-0048	3334	2681			14464

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4802 N	05117 W		150	81	05	30	087	1963		8680	0170	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		07	F04		043			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10[7]	Σ ΔD DYN. M. X 10[3]	SOUND VELOCITY
		STD	0000	0337	3267	2602	0019991	0000	14610
089		OBS	0000	0337	3267	2602			14610
		STD	0010	0266	3268	2609	0019336	0020	14581
		STD	0020	0200	3270	2615	0018698	0039	14554
089		OBS	0023	0181	3271	2618			14547
		STD	0030	0144	3273	2622	0018113	0057	14532
089		OBS	0046	0049	3277	2631			14492
		STD	0050	0012	3282	2636	0016680	0092	14476
089		OBS	0069	-0112	3300	2656			14425
		STD	0075	-0124	3303	2659	0014541	0131	14420
089		OBS	0093	-0141	3312	2666			14417
		STD	0100	-0123	3316	2669	0013532	0166	14427
		STD	0125	-0058	3332	2680	0012531	0199	14464
		STD	0150	0008	3350	2691	0011452	0229	14500
089		OBS	T0162	0039	3360	2698			14518

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4810 N	05136 W		150	81	05	30	109	1963		8681	0200	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		09	F04		055			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0337	3268	2603	0019916	0000	14611
112		OBS	0000	0337	3268	2603			14611
		STD	0010	0255	3270	2611	0019100	0020	14577
		STD	0020	0174	3272	2619	0018368	0038	14543
112		OBS	0025	0134	3274	2623			14526
		STD	0030	0089	3276	2628	0017540	0056	14507
112		OBS	0049	-0051	3284	2641			14447
		STD	0050	-0058	3285	2642	0016155	0090	14445
112		OBS	0074	-0161	3299	2656			14402
		STD	0075	-0160	3299	2657	0014726	0128	14403
112		OBS	0098	-0147	3307	2663			14414
		STD	0100	-0139	3309	2664	0014020	0164	14418
		STD	0125	-0057	3328	2677	0012838	0196	14463
112		OBS	0148	-0010	3340	2684			14491
		STD	0150	-0007	3341	2685	0012064	0229	14492
112		OBS	T0182	0009	3348	2690			14506

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48165N	05153 W		150	81	05	30	128	1963		8682	0190	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		09	F04		073			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0466	3232	2561	0023857	0000	14660
131		OBS	0000	0466	3232	2561			14660
		STD	0010	0302	3253	2594	0020759	0022	14595
		STD	0020	0177	3268	2615	0018692	0042	14544
131		OBS	0026	0120	3274	2624			14520
		STD	0030	0113	3275	2625	0017770	0060	14518
		STD	0050	0042	3279	2632	0017087	0095	14490
131		OBS	0052	0032	3279	2633			14485
		STD	0075	-0137	3294	2652	0015193	0135	14413
131		OBS	0078	-0149	3295	2653			14408
		STD	0100	-0159	3300	2657	0014657	0173	14408
131		OBS	0105	-0161	3302	2659			14408
		STD	0125	-0139	3309	2664	0014003	0209	14422
		STD	0150	-0094	3322	2675	0013141	0245	14449
131		OBS	0157	-0078	3327	2677			14459
131		OBS	T0183	-0006	3349	2691			14499

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48235N	05212 W		150	82	05	30	145	1963		8683	0183	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		09	F04		075			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0475	3241	2567	0023251	0000	14665
148		OBS	0000	0475	3241	2567			14665
		STD	0010	0294	3258	2598	0020316	0022	14592
		STD	0020	0143	3271	2620	0018243	0041	14529
148		OBS	0025	0079	3275	2627			14502
		STD	0030	0019	3276	2631	0017192	0059	14475
		STD	0050	-0128	3279	2639	0016387	0092	14411
148		OBS	0050	-0128	3279	2639			14411
		STD	0075	-0106	3300	2656	0014826	0131	14428
148		OBS	0075	-0106	3300	2656			14428
		STD	0100	-0093	3303	2658	0014633	0166	14439
148		OBS	0101	-0092	3303	2658			14440
		STD	0125	-0074	3309	2662	0014222	0204	14453
		STD	0150	-0056	3328	2677	0012833	0238	14468
148		OBS	0151	-0055	3329	2677			14469
148		OBS	T0176	0042	3361	2698			14522

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4831 N	05231 W		150	82	05	30	173	1963		8684	0252	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F03		074			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0511	3157	2497	0029938	0000	14669
175		OBS	0000	0511	3157	2497			14669
		STD	0010	0213	3218	2573	0022733	0026	14551
		STD	0020	-0002	3262	2621	0018154	0047	14462
175		OBS	0025	-0078	3277	2636			14430
		STD	0030	-0094	3279	2639	0016478	0064	14424
		STD	0050	-0138	3289	2647	0015630	0096	14408
175		OBS	0051	-0139	3289	2648			14407
		STD	0075	-0144	3295	2653	0015114	0135	14410
175		OBS	0076	-0144	3295	2653			14410
		STD	0100	-0152	3298	2655	0014837	0172	14411
175		OBS	0101	-0152	3298	2655			14411
		STD	0125	-0150	3301	2658	0014585	0209	14416
		STD	0150	-0136	3307	2662	0014148	0245	14428
175		OBS	0152	-0134	3308	2663			14429
		STD	0200	-0068	3331	2679	0012532	0311	14471
175		OBS	0202	-0063	3333	2681			14474
175		OBS	T0243	0081	3374	2707			14552

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48395N	052465W		150	82	05	30	188	1963		8685	0131	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		18	F02		076			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0495	3183	2519	0027818	0000	14666
190		OBS	0000	0495	3183	2519			14666
		STD	0010	0313	3230	2574	0022589	0025	14597
		STD	0020	0169	3264	2613	0018942	0046	14540
190		OBS	0026	0101	3279	2629			14512
		STD	0030	0076	3282	2633	0017011	0064	14502
		STD	0050	-0029	3292	2646	0015735	0097	14459
190		OBS	0052	-0037	3295	2648			14456
		STD	0075	-0107	3294	2651	0015290	0135	14427
190		OBS	0077	-0111	3294	2651			14425
		STD	0100	-0132	3299	2656	0014807	0173	14420
190		OBS	0103	-0134	3300	2657			14420
190		OBS	T0124	-0138	3306	2661			14422

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4844 N	052575W		150	82	05	30	200	1963		8686	0075	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F02		068			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0578	3129	2468	0032762	0000	14693
202		OBS	0000	0578	3129	2468			14693
		STD	0010	0240	3197	2554	0024519	0029	14560
		STD	0020	0001	3247	2609	0019314	0051	14462
202		OBS	0026	-0096	3267	2629			14420
		STD	0030	-0098	3268	2630	0017332	0069	14420
		STD	0050	-0106	3275	2635	0016757	0103	14421
202		OBS	0052	-0107	3276	2636			14421
202		OBS	T0073	-0108	3291	2648			14426

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4849 N	05245 W		150	82	05	30	215	1963		8687	0170	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		14	F02		057			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0331	3212	2559	0024096	0000	14600
217		OBS	0000	0331	3212	2559			14600
		STD	0010	0269	3245	2590	0021101	0023	14580
		STD	0020	0205	3270	2615	0018733	0043	14557
217		OBS	0026	0166	3281	2627			14542
		STD	0030	0133	3283	2631	0017261	0061	14528
		STD	0050		3294	2646	0015747	0094	14473
217		OBS	0051	-0005	3294	2647			14470
		STD	0075	-0088	3297	2653	0015123	0132	14436
217		OBS	0076	-0090	3297	2653			14436
		STD	0100	-0110	3305	2660	0014415	0169	14431
217		OBS	0102	-0111	3306	2661			14431
		STD	0125	-0124	3311	2665	0013896	0204	14430
		STD	0150	-0132	3313	2667	0013701	0239	14430
217		OBS	T0153	-0133	3313	2667			14430

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4851 N	05241 W		150	82	05	30	222	1963		8688	0280	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F04		057			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0448	3233	2564	0023582	0000	14653
225		OBS	0000	0448	3233	2564			14653
		STD	0010	0328	3258	2595	0020599	0022	14607
		STD	0020	0223	3277	2619	0018332	0042	14566
225		OBS	0025	0176	3284	2628			14547
		STD	0030	0133	3286	2633	0017063	0059	14528
		STD	0050	0001	3293	2646	0015813	0092	14473
225		OBS	0051	-0004	3293	2646			14471
		STD	0075	-0075	3295	2651	0015322	0131	14442
225		OBS	0076	-0077	3295	2651			14441
		STD	0100	-0104	3306	2660	0014389	0168	14434
225		OBS	0101	-0105	3306	2661			14434
		STD	0125	-0108	3313	2666	0013786	0203	14437
		STD	0150	-0112	3320	2672	0013201	0237	14441
225		OBS	0152	-0112	3321	2673			14441
		STD	0200	-0092	3326	2676	0012817	0302	14459
225		OBS	0202	-0089	3327	2677			14461
		STD	0250	0027	3363	2701	0010551	0361	14528
225		OBS	T0258	0055	3372	2707			14543

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4855 N	052235W		150	82	05	31	001	1963		8689	0345	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F04		056			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0414	3229	2564	0023555	0000	14638
005		OBS	0000	0414	3229	2564			14638
		STD	0010	0288	3255	2597	0020494	0022	14589
		STD	0020	0170	3274	2621	0018190	0041	14542
005		OBS	0026	0103	3283	2632			14514
		STD	0030	0048	3285	2637	0016626	0059	14490
		STD	0050	-0139	3296	2653	0015091	0090	14408
005		OBS	0051	-0144	3296	2654			14406
		STD	0075	-0151	3302	2658	0014580	0128	14407
005		OBS	0077	-0152	3302	2659			14407
		STD	0100	-0147	3304	2660	0014397	0164	14414
005		OBS	0102	-0146	3304	2660			14415
		STD	0125	-0141	3307	2662	0014151	0199	14421
		STD	0150	-0129	3312	2666	0013787	0234	14432
005		OBS	0153	-0127	3313	2667			14433
		STD	0200	-0085	3327	2677	0012768	0301	14463
005		OBS	0204	-0079	3329	2678			14466
		STD	0250	0010	3359	2699	0010760	0360	14519
		STD	0300	0157	3410	2731	0007858	0406	14601
005		OBS	T0306	0178	3417	2735			14612

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4901 N	05202 W		150	92	05	31	020	1963		8690	0293	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		11	F04		059			

MESSENGER TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0446	3276	2598	0020326	0000	14658
024		OBS	0000	0446	3276	2598			14658
		STD	0010	0310	3277	2612	0019011	0020	14602
		STD	0020	0199	3280	2623	0017933	0038	14555
024		OBS	0025	0152	3282	2628			14536
		STD	0030	0121	3288	2635	0016814	0056	14523
		STD	0050	0008	3303	2654	0015059	0087	14477
024		OBS	0050	0008	3303	2654			14477
024		OBS	0074	-0110	3307	2661			14427
		STD	0075	-0111	3307	2662	0014243	0124	14427
024		OBS	0099	-0124	3317	2670			14426
		STD	0100	-0123	3318	2670	0013416	0159	14427
		STD	0125	-0101	3331	2681	0012441	0191	14443
024		OBS	0149	-0080	3344	2690			14459
		STD	0150	-0077	3345	2691	0011449	0221	14461
024		OBS	0199	0050	3384	2717			14532
		STD	0200	0053	3385	2717	0009036	0272	14534
		STD	0250	0180	3422	2738	0007113	0312	14604
024		OBS	T0273	0238	3438	2747			14636

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4905 N	05150 W		150	91	05	31	038	1963		8691	0298	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		14	F04		056			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0415	3276	2601	0020023	0000	14645
041		OBS	0000	0415	3276	2601			14645
		STD	0010	0364	3277	2607	0019480	0020	14625
		STD	0020	0295	3280	2616	0018665	0039	14597
041		OBS	0025	0253	3283	2622			14580
		STD	0030	0180	3288	2631	0017196	0057	14550
		STD	0050	-0026	3305	2657	0014754	0089	14462
041		OBS	0050	-0026	3305	2657			14462
		STD	0075	-0093	3316	2668	0013644	0124	14437
041		OBS	0075	-0093	3316	2668			14437
		STD	0100	-0107	3321	2673	0013200	0158	14435
041		OBS	0100	-0107	3321	2673			14435
		STD	0125	-0070	3341	2688	0011793	0189	14459
		STD	0150	-0019	3360	2701	0010558	0217	14490
041		OBS	0150	-0019	3360	2701			14490
		STD	0200	0124	3396	2722	0008656	0265	14568
041		OBS	0200	0124	3396	2722			14568
		STD	0250	0227	3433	2744	0006662	0303	14626
041		OBS	T0275	0263	3452	2756			14649

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4912 N	05131 W		150	91	05	31	058	1963		8692	0318	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F04		057			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0391	3258	2590	0021154	0000	14632
061		OBS	0000	0391	3258	2590			14632
		STD	0010	0219	3279	2621	0018149	0020	14562
		STD	0020	0087	3295	2643	0016083	0037	14507
061		OBS	0025	0037	3301	2651			14486
		STD	0030	0012	3304	2654	0015007	0052	14476
		STD	0050	-0060	3314	2665	0013929	0081	14448
061		OBS	0050	-0060	3314	2665			14448
		STD	0075	-0085	3322	2673	0013213	0115	14441
061		OBS	0075	-0085	3322	2673			14441
		STD	0100	-0105	3334	2683	0012212	0147	14438
061		OBS	0100	-0105	3334	2683			14438
		STD	0125	-0030	3355	2697	0010895	0176	14480
		STD	0150	0038	3374	2709	0009788	0202	14518
061		OBS	0151	0041	3375	2710			14519
		STD	0200	0153	3410	2731	0007802	0246	14582
061		OBS	0202	0157	3411	2731			14585
		STD	0250	0243	3441	2749	0006195	0281	14635
		STD	0300	0309	3469	2765	0004720	0308	14675
061		OBS	T0302	0311	3470	2766			14676

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4922 N	051005W		150	91	05	31	085	1963		8693	0332	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		14	F04		057			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0397	3283	2609	0019325	0000	14638
087		OBS	0000	0397	3283	2609			14638
		STD	0010	0252	3290	2627	0017562	0018	14578
		STD	0020	0128	3297	2642	0016173	0035	14526
087		OBS	0025	0074	3300	2648			14503
		STD	0030	0020	3303	2653	0015121	0051	14480
		STD	0050	-0117	3315	2668	0013657	0080	14421
087		OBS	0052	-0124	3316	2669			14418
		STD	0075	-0107	3330	2680	0012525	0112	14432
087		OBS	0077	-0103	3332	2681			14435
		STD	0100	-0019	3359	2700	0010648	0141	14481
087		OBS	0103	-0009	3362	2702			14487
		STD	0125	0059	3382	2714	0009300	0166	14524
		STD	0150	0121	3401	2726	0008248	0188	14559
087		OBS	0154	0130	3404	2728			14564
		STD	0200	0196	3430	2744	0006616	0225	14604
087		OBS	0205	0203	3433	2745			14609
		STD	0250	0256	3452	2756	0005480	0256	14642
		STD	0300	0302	3467	2764	0004803	0281	14672
087		OBS	T0308	0308	3469	2765			14676

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4933 N	050295W		150	90	05	31	112	1963		8694	0330	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		14	F04		055			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0382	3280	2608	0019412	0000	14631
115		OBS	0000	0382	3280	2608			14631
		STD	0010	0319	3288	2620	0018256	0019	14607
		STD	0020	0230	3296	2634	0016944	0036	14571
115		OBS	0023	0198	3298	2638			14558
		STD	0030	0069	3302	2650	0015449	0053	14502
115		OBS	0045	-0108	3313	2666			14424
		STD	0050	-0109	3316	2669	0013606	0082	14425
115		OBS	0068	-0112	3332	2682			14429
		STD	0075	-0083	3342	2689	0011690	0113	14445
115		OBS	0091	-0021	3362	2702			14479
		STD	0100	0016	3371	2708	0009904	0140	14499
		STD	0125	0099	3393	2721	0008708	0164	14544
115		OBS	0136	0127	3401	2725			14559
		STD	0150	0145	3410	2731	0007732	0184	14571
115		OBS	0181	0183	3428	2743			14595
		STD	0200	0205	3437	2749	0006158	0219	14609
		STD	0250	0260	3456	2759	0005214	0247	14644
115		OBS	T0272	0282	3461	2761			14658

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4942 N	05002 W		150	90	05	31	138	1963		8695	0630	06

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		16	F05		060			

MESSENGER TIME HR 1/10 or CAST NO	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0350	3318	2641	0016255	0000	14623
142	OBS	0000	0350	3318	2641			14623
	STD	0010	0276	3318	2647	0015663	0016	14593
	STD	0020	0206	3317	2653	0015162	0031	14564
142	OBS	0024	0180	3317	2654			14553
	STD	0030	0131	3321	2661	0014366	0046	14532
142	OBS	0047	0044	3337	2679			14498
	STD	0050	0045	3341	2682	0012346	0075	14500
142	OBS	0071	0050	3372	2707			14510
	STD	0075	0082	3381	2712	0009511	0100	14526
142	OBS	0094	0198	3414	2731			14585
	STD	0100	0199	3417	2733	0007581	0122	14587
	STD	0125	0203	3427	2741	0006866	0140	14595
142	OBS	0143	0206	3435	2747			14600
	STD	0150	0216	3439	2749	0006073	0156	14606
142	OBS	T0190	0269	3456	2758			14638
	STD	0200	0280	3459	2760	0005134	0184	14645
	STD	0250	0327	3472	2766	0004629	0208	14675
142	OBS	0287	0350	3479	2769			14692
	STD	0300	0353	3480	2770	0004326	0231	14695
142	OBS	0386	0366	3484	2772			14716
	STD	0400	0365	3485	2772	0004157	0273	14718
	STD	0500	0355	3488	2776	0003915	0313	14730
142	OBS	T0588	0346	3490	2778			14742

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	49505N	04932 W		149	99	05	31	167	1963		8696	1360	12

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		16	F04		063			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0382	3293	2618	0018431	0000	14633
171		OBS	0000	0382	3293	2618			14633
		STD	0010	0323	3355	2673	0013231	0016	14618
		STD	0020	0275	3398	2712	0009582	0027	14605
171		OBS	0022	0266	3404	2717			14602
		STD	0030	0227	3411	2726	0008219	0036	14587
171		OBS	0045	0197	3422	2737			14578
		STD	0050	0216	3426	2739	0007009	0051	14588
171		OBS	0067	0254	3436	2744			14609
		STD	0075	0246	3438	2746	0006352	0068	14607
171		OBS	0090	0238	3442	2750			14606
		STD	0100	0248	3445	2751	0005854	0083	14613
		STD	0125	0270	3452	2755	0005526	0098	14627
171		OBS	0134	0277	3454	2756			14632
		STD	0150	0287	3458	2758	0005239	0111	14639
171		OBS	T0179	0301	3464	2762			14651
		STD	0200	0304	3467	2764	0004750	0136	14656
		STD	0250	0313	3474	2769	0004345	0159	14669
171		OBS	0270	0317	3476	2770			14675
		STD	0300	0323	3478	2771	0004179	0180	14682
171		OBS	0360	0335	3481	2772			14698
		STD	0400	0345	3483	2773	0004104	0221	14709
		STD	0500	0362	3488	2775	0003992	0262	14733
171		OBS	T0542	0366	3489	2776			14742
		STD	0600	0365	3489	2776	0004037	0302	14751
		STD	0700	0362	3489	2776	0004091	0343	14767
171		OBS	0731	0361	3489	2776			14771
		STD	0800	0355	3489	2777	0004097	0384	14780
		STD	0900	0348	3489	2777	0004101	0425	14794
171		OBS	T0924	0347	3489	2777			14798
		STD	1000	0344	3489	2778	0004136	0466	14809
		STD	1100	0343	3488	2777	0004277	0508	14825
171		OBS	T1158	0343	3488	2777			14835

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	5000 N	04900 W		185	09	05	31	200	1963		8697	1840	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		18	F05		072			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0575	3400	2682	0012415	0000	14727
203	OBS	0000	0575	3400	2682			14727
	STD	0010	0570	3427	2704	0010348	0011	14731
	STD	0020	0551	3446	2721	0008717	0021	14727
203	OBS	0024	0539	3451	2726			14724
	STD	0030	0505	3452	2731	0007773	0029	14711
203	OBS	0048	0421	3454	2742			14679
	STD	0050	0414	3455	2744	0006589	0044	14677
203	OBS	0072	0352	3461	2755			14655
	STD	0075	0348	3462	2756	0005440	0059	14654
203	OBS	0096	0327	3468	2763			14649
	STD	0100	0327	3469	2763	0004736	0071	14650
	STD	0125	0326	3473	2767	0004450	0083	14654
203	OBS	0144	0326	3476	2769			14658
	STD	0150	0328	3477	2770	0004184	0094	14660
203	OBS	T0192	0339	3482	2773			14672
	STD	0200	0341	3482	2773	0003958	0114	14674
	STD	0250	0349	3484	2773	0003959	0134	14686
203	OBS	0289	0353	3485	2774			14694
	STD	0300	0353	3485	2774	0003931	0153	14696
203	OBS	0386	0355	3488	2776			14712
	STD	0400	0355	3488	2776	0003825	0192	14714
	STD	0500	0353	3489	2777	0003808	0230	14730
203	OBS	T0581	0351	3490	2778			14742
	STD	0600	0350	3490	2778	0003808	0268	14745
	STD	0700	0347	3489	2778	0003896	0307	14760
203	OBS	0774	0345	3489	2778			14772
	STD	0800	0344	3489	2778	0003974	0346	14776
	STD	0900	0341	3489	2778	0004021	0386	14791
203	OBS	T0966	0339	3489	2778			14801
	STD	1000	0339	3489	2778	0004065	0427	14807
	STD	1100	0340	3490	2779	0004107	0468	14824
	STD	1200	0340	3490	2779	0004148	0509	14841
	STD	1300	0341	3491	2780	0004190	0551	14858
	STD	1400	0342	3492	2780	0004231	0593	14876
203	OBS	T1463	0342	3492	2780			14886

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	45595N	04859 W		149	58	07	13	209	1963		8698	1865	15

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		11	F03		095			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0842	3414	2656	0014878	0000	14834
228		OBS	0000	0842	3414	2656			14834
		STD	0010	0841	3430	2668	0013696	0014	14838
		STD	0020	0840	3444	2679	0012663	0027	14841
228		OBS	0025	0840	3450	2684			14842
		STD	0030	0776	3456	2698	0010867	0039	14819
		STD	0050	0588	3471	2736	0007325	0057	14750
228		OBS	0052	0575	3472	2738			14746
		STD	0075	0517	3473	2746	0006382	0075	14726
228		OBS	0077	0511	3473	2747			14724
		STD	0100	0418	3470	2755	0005583	0090	14689
228		OBS	0104	0408	3469	2755			14685
		STD	0125	0417	3477	2761	0005040	0103	14693
		STD	0150	0427	3483	2764	0004726	0115	14702
228		OBS	0154	0429	3484	2765			14704
		STD	0200	0398	3486	2770	0004260	0137	14699
228		OBS	T0206	0395	3486	2770			14699
		STD	0250	0373	3486	2772	0004035	0158	14696
		STD	0300	0357	3486	2774	0003917	0178	14698
228		OBS	0309	0355	3486	2774			14699
		STD	0400	0357	3489	2776	0003799	0217	14715
228		OBS	0409	0357	3489	2776			14716
		STD	0500	0353	3489	2777	0003847	0255	14729
		STD	0600	0348	3488	2777	0003915	0294	14744
228		OBS	T0610	0347	3488	2777			14745
		STD	0700	0345	3488	2777	0003946	0333	14759
		STD	0800	0342	3489	2778	0003963	0373	14775
228		OBS	0812	0342	3489	2778			14777
		STD	0900	0340	3489	2778	0004043	0413	14791
		STD	1000	0338	3488	2778	0004136	0453	14807
228		OBS	T1014	0338	3488	2777			14809
		STD	1100	0339	3489	2778	0004151	0495	14823
		STD	1200	0339	3490	2779	0004148	0536	14841
		STD	1300	0340	3491	2780	0004144	0578	14858
		STD	1400	0340	3493	2781	0004148	0619	14875
		STD	1500	0341	3494	2782	0004145	0661	14892
228		OBS	T1525	0341	3494	2782			14897

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4936 N	04910 W		149	99	07	14	014	1963		8699	1664	14

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		16	F02		085			

MESSENGER TIME HR 1/10	or CAST NO	CARD TYPE	DEPTH (m)	T °C	S °/°°	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0650	3288	2584	0021692	0000	14743
019		OBS	0000	0650	3288	2584			14743
		STD	0010	0476	3351	2654	0015002	0018	14682
		STD	0020	0366	3399	2704	0010309	0031	14644
019		OBS	0024	0339	3414	2719			14635
		STD	0030	0363	3427	2727	0008179	0040	14648
019		OBS	0048	0391	3454	2745			14667
		STD	0050	0384	3455	2747	0006291	0055	14664
019		OBS	0072	0329	3462	2758			14645
		STD	0075	0326	3463	2759	0005160	0069	14645
019		OBS	0096	0315	3469	2765			14644
		STD	0100	0319	3470	2765	0004588	0081	14647
		STD	0125	0338	3477	2769	0004258	0092	14660
019		OBS	0143	0345	3480	2770			14666
		STD	0150	0343	3480	2771	0004094	0103	14666
019		OBS	T0191	0335	3481	2772			14670
		STD	0200	0336	3482	2773	0003920	0123	14672
		STD	0250	0338	3485	2775	0003761	0142	14682
019		OBS	0287	0340	3486	2776			14689
		STD	0300	0342	3486	2776	0003759	0161	14692
019		OBS	0382	0352	3487	2775			14710
		STD	0400	0351	3487	2776	0003851	0199	14712
		STD	0500	0344	3488	2777	0003788	0237	14726
019		OBS	T0575	0341	3489	2778			14737
		STD	0600	0341	3489	2778	0003779	0275	14741
		STD	0700	0341	3489	2778	0003860	0313	14758
019		OBS	0765	0340	3489	2778			14768
		STD	0800	0339	3489	2778	0003949	0352	14774
		STD	0900	0338	3488	2777	0004091	0392	14790
019		OBS	T0954	0337	3487	2777			14798
		STD	1000	0337	3487	2777	0004178	0434	14806
		STD	1100	0338	3488	2778	0004206	0476	14823
		STD	1200	0339	3489	2778	0004235	0518	14841
		STD	1300	0340	3490	2779	0004257	0560	14858
		STD	1400	0341	3491	2779	0004286	0603	14875
019		OBS	T1439	0341	3491	2780			14882

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4913 N	04919 W		149	99	07	14	043	1963		8700	1591	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		14	F02		085			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0679	3311	2598	0020334	0000	14757
048		OBS	0000	0679	3311	2598			14757
		STD	0010	0650	3323	2611	0019089	0020	14749
		STD	0020	0589	3341	2633	0017020	0038	14729
048		OBS	0024	0556	3350	2644			14717
		STD	0030	0445	3372	2674	0013122	0053	14675
048		OBS	0048	0246	3422	2733			14600
		STD	0050	0253	3425	2735	0007378	0073	14604
048		OBS	0073	0308	3449	2749			14635
		STD	0075	0310	3450	2750	0005995	0090	14636
048		OBS	0097	0324	3463	2759			14647
		STD	0100	0324	3464	2760	0005087	0104	14648
		STD	0125	0325	3471	2765	0004589	0116	14654
048		OBS	0146	0326	3476	2769			14658
		STD	0150	0326	3476	2769	0004213	0127	14659
048		OBS	T0196	0330	3481	2773			14669
		STD	0200	0331	3481	2773	0003930	0147	14670
		STD	0250	0342	3485	2775	0003807	0167	14683
048		OBS	0294	0348	3488	2777			14693
		STD	0300	0348	3488	2777	0003669	0185	14694
048		OBS	0393	0348	3489	2777			14710
		STD	0400	0348	3489	2777	0003686	0222	14711
		STD	0500	0346	3489	2778	0003749	0259	14727
048		OBS	T0590	0344	3489	2778			14741
		STD	0600	0344	3489	2778	0003803	0297	14743
		STD	0700	0343	3490	2778	0003837	0335	14759
048		OBS	0786	0342	3490	2779			14773
		STD	0800	0342	3490	2779	0003878	0374	14775
		STD	0900	0339	3490	2779	0003925	0413	14790
048		OBS	T0981	0338	3490	2779			14804
		STD	1000	0338	3490	2779	0003986	0452	14807
		STD	1100	0339	3491	2779	0004040	0493	14824
		STD	1200	0339	3491	2780	0004094	0533	14841
		STD	1300	0339	3491	2780	0004147	0574	14858
		STD	1400	0340	3492	2780	0004200	0616	14875
048		OBS	T1476	0340	3492	2780			14888

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4840 N	04934 W		149	89	07	14	083	1963		8701	0969	09

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		27	F02		115			

MESSENGER TIME HR. 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0819	3180	2476	0031957	0000	14795
088		OBS	0000	0819	3180	2476			14795
		STD	0010	0660	3235	2541	0025790	0029	14741
		STD	0020	0481	3275	2594	0020773	0052	14676
088		OBS	0023	0423	3284	2607			14653
		STD	0030	0219	3293	2632	0017093	0071	14568
088		OBS	0046	-0082	3308	2661			14436
		STD	0050	-0095	3310	2663	0014118	0102	14431
088		OBS	0069	-0115	3319	2671			14426
		STD	0075	-0100	3329	2679	0012625	0136	14435
088		OBS	0092	-0047	3355	2698			14466
		STD	0100	0007	3371	2708	0009859	0164	14495
		STD	0125	0138	3409	2731	0007753	0186	14563
088		OBS	0139	0186	3423	2739			14589
		STD	0150	0193	3426	2741	0006874	0204	14594
088		OBS	T0185	0218	3435	2746			14612
		STD	0200	0236	3442	2750	0006034	0236	14623
		STD	0250	0285	3462	2762	0004987	0264	14656
088		OBS	0278	0305	3470	2766			14670
		STD	0300	0313	3473	2768	0004458	0288	14677
088		OBS	0370	0334	3482	2773			14699
		STD	0400	0337	3483	2774	0004023	0330	14706
		STD	0500	0343	3487	2776	0003867	0369	14725
088		OBS	T0556	0345	3488	2777			14735
		STD	0600	0345	3489	2778	0003816	0408	14743
		STD	0700	0344	3490	2779	0003813	0446	14759
088		OBS	0742	0343	3490	2779			14766
		STD	0800	0343					
		STD	0900	0343					
088		OBS	0927	0343					

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4832 N	04932 W		149	89	07	14	096	1963		8702	0658	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		27	F02		115			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0802	3186	2483	0031276	0000	14789
101		OBS	0000	0802	3186	2483			14789
		STD	0010	0769	3196	2496	0030099	0031	14779
		STD	0020	0669	3206	2517	0028081	0060	14743
101		OBS	0023	0626	3209	2525			14727
		STD	0030	0427	3249	2579	0022193	0085	14651
101		OBS	0045	0128	3315	2656			14533
		STD	0050	0089	3328	2669	0013582	0121	14518
101		OBS	0068	0006	3363	2702			14488
		STD	0075	0011	3368	2706	0010111	0150	14492
101		OBS	0090	0030	3379	2714			14505
		STD	0100	0064	3388	2719	0008874	0174	14523
		STD	0125	0135	3407	2730	0007884	0195	14562
101		OBS	0136	0160	3414	2734			14576
		STD	0150	0181	3421	2738	0007161	0214	14588
101		OBS	T0181	0222	3436	2746			14613
		STD	0200	0239	3444	2751	0005909	0246	14625
		STD	0250	0278	3460	2761	0005074	0274	14652
101		OBS	0273	0292	3466	2764			14663
		STD	0300	0305	3470	2766	0004607	0298	14674
101		OBS	0365	0330	3479	2771			14696
		STD	0400	0333	3480	2772	0004180	0342	14703
		STD	0500	0340	3484	2774	0004053	0383	14724
101		OBS	T0552	0344	3486	2775			14734

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4811 N	04940 W		149	89	07	14	124	1963		8703	0219	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		25	F03		118			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S °/oo	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0881	3224	2501	0029563	0000	14824
127		OBS	0000	0881	3224	2501			14824
		STD	0010	0825	3236	2519	0027886	0029	14806
		STD	0020	0695	3250	2548	0025119	0055	14759
127		OBS	0025	0603	3258	2566			14724
		STD	0030	0398	3270	2598	0020334	0078	14642
		STD	0050	-0134	3302	2658	0014605	0113	14411
127		OBS	0050	-0134	3302	2658			14411
		STD	0075	-0132	3307	2662	0014226	0149	14417
127		OBS	0076	-0132	3307	2662			14417
		STD	0100	-0121	3317	2670	0013461	0184	14428
127		OBS	0101	-0120	3318	2671			14429
		STD	0125	-0064	3338	2685	0012046	0215	14462
		STD	0150	-0004	3359	2699	0010707	0244	14496
127		OBS	0152	0001	3361	2701			14499
		STD	0200	0119	3401	2726	0008243	0291	14566
127		OBS	T0202	0124	3403	2727			14569

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4759 N	04945 W		149	79	07	14	140	1963		8704	0165	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		120			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0878	3252	2523	0027438	0000	14827
143	OBS	0000	0878	3252	2523			14827
	STD	0010	0787	3259	2542	0025647	0027	14795
	STD	0020	0644	3267	2568	0023214	0051	14741
143	OBS	0025	0553	3272	2583			14706
	STD	0030	0372	3280	2609	0019339	0072	14632
	STD	0050	-0096	3303	2658	0014643	0106	14429
143	OBS	0050	-0096	3303	2658			14429
	STD	0075	-0110	3315	2668	0013664	0142	14429
143	OBS	0075	-0110	3315	2668			14429
	STD	0100	-0069	3334	2682	0012343	0174	14455
143	OBS	0100	-0069	3334	2682			14455
	STD	0125	-0019	3354	2696	0011022	0203	14485
	STD	0150	0040	3374	2709	0009799	0229	14518
143	OBS	T0150	0040	3374	2709			14518

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4745 N	04953 W		149	79	07	14	156	1963		8705	0101	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		120			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0839	3263	2538	0026059	0000	14813
159	OBS	0000	0839	3263	2538			14813
	STD	0010	0765	3266	2551	0024827	0025	14787
	STD	0020	0663	3270	2568	0023223	0049	14749
159	OBS	0025	0601	3272	2577			14725
	STD	0030	0503	3274	2591	0021089	0072	14686
	STD	0050	0189	3287	2630	0017337	0110	14557
159	OBS	0050	0189	3287	2630			14557
	STD	0075	-0034	3319	2668	0013642	0149	14465
159	OBS	0075	-0034	3319	2668			14465
	STD	0100	-0040	3324	2673	0013225	0182	14467
159	OBS	T0100	-0040	3324	2673			14467

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	47235N	04959 W		149	79	07	14	177	1963		8706	0091	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		125			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0884	3267	2534	0026411	0000	14831
180		OBS	0000	0884	3267	2534			14831
		STD	0010	0854	3269	2540	0025881	0026	14821
		STD	0020	0763	3270	2555	0024509	0051	14788
180		OBS	0026	0678	3271	2567			14756
		STD	0030	0552	3275	2586	0021550	0074	14706
		STD	0050	0102	3297	2644	0016016	0112	14519
180		OBS	0051	0087	3298	2645			14513
		STD	0075	-0017	3329	2676	0012951	0148	14474
180		OBS	T0077	-0026	3332	2678			14470

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4734 N	05023 W		150	70	07	14	196	1963		8707	0119	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F02		123			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0973	3262	2516	0028128	0000	14863
199		OBS	0000	0973	3262	2516			14863
		STD	0010	0862	3264	2535	0026338	0027	14824
		STD	0020	0725	3266	2556	0024326	0053	14773
199		OBS	0026	0630	3267	2570			14736
		STD	0030	0528	3270	2585	0021659	0076	14696
		STD	0050	0145	3291	2636	0016738	0114	14538
199		OBS	0051	0131	3292	2638			14532
		STD	0075	-0033	3329	2676	0012882	0151	14466
199		OBS	0076	-0036	3330	2677			14465
		STD	0100	-0030	3337	2682	0012316	0182	14473
199		OBS	T0102	-0029	3337	2683			14474

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4743 N	05042 W		150	70	07	14	212	1963		8708	0128	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		22	F02		122			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0959	3265	2521	0027689	0000	14859
215	OBS	0000	0959	3265	2521			14859
	STD	0010	0854	3266	2538	0026081	0027	14821
	STD	0020	0719	3267	2558	0024196	0052	14771
215	OBS	0026	0623	3267	2571			14734
	STD	0030	0516	3270	2586	0021529	0075	14691
	STD	0050	0120	3288	2635	0016809	0113	14526
215	OBS	0051	0106	3289	2637			14520
	STD	0075	-0045	3324	2673	0013214	0151	14460
215	OBS	0076	-0048	3325	2674			14459
	STD	0100	-0040	3339	2685	0012080	0182	14469
215	OBS	T0102	-0032	3339	2684			14473

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4751 N	05100 W		150	71	07	14	229	1963		8709	0128	01

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F02		123			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M. X 10³	SOUND VELOCITY
	STD	0000	0992	3253	2506	0029093	0000	14869
231	OBS	0000	0992	3253	2506			14869
	STD	0010	0865	3256	2529	0026969	0028	14824
	STD	0020	0716	3260	2553	0024642	0054	14769
231	OBS	0026	0617	3264	2569			14731
	STD	0030	0514	3267	2584	0021732	0077	14690
	STD	0050	0124	3286	2633	0016985	0116	14528
231	OBS	0052	0096	3288	2637			14516
	STD	0075	-0069	3323	2673	0013195	0153	14449
231	OBS	0077	-0075	3325	2675			14447
	STD	0100	-0051	3338	2684	0012110	0185	14463
231	OBS	T0103	-0035	3338	2684			14471

731–298 O—64——22

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4800 N	05120 W		150	81	07	15	006	1963		8710	0165	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		22	F02		126			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0989	3218	2479	0031639	0000	14864
008	OBS	0000	0989	3218	2479			14864
	STD	0010	0887	3229	2504	0029295	0030	14829
	STD	0020	0732	3242	2537	0026193	0058	14773
008	OBS	0026	0612	3250	2559			14727
	STD	0030	0454	3259	2584	0021708	0082	14664
	STD	0050	-0080	3291	2648	0015617	0119	14435
008	OBS	0051	-0096	3292	2649			14428
	STD	0075	-0130	3304	2660	0014446	0157	14418
008	OBS	0077	-0131	3305	2660			14418
	STD	0100	-0126	3312	2666	0013829	0192	14425
008	OBS	0103	-0123	3313	2667			14427
	STD	0125	-0090	3324	2675	0013016	0226	14447
	STD	0150	-0023	3342	2686	0011911	0257	14485
008	OBS	T0154	-0009	3345	2688			14493

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4806 N	05136 W		150	81	07	15	023	1963		8711	0201	02

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F02		124			

MESSENGER TIME HR 1/10 or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
	STD	0000	0994	3196	2461	0033348	0000	14863
026	OBS	0000	0994	3196	2461			14863
	STD	0010	0881	3205	2486	0030991	0032	14823
	STD	0020	0720	3218	2520	0027828	0062	14765
026	OBS	0026	0600	3229	2544			14719
	STD	0030	0446	3243	2572	0022832	0087	14658
	STD	0050	-0072	3291	2647	0015645	0125	14439
026	OBS	0051	-0087	3293	2649			14432
	STD	0075	-0113	3305	2660	0014459	0163	14426
026	OBS	0076	-0114	3305	2660			14425
	STD	0100	-0127	3312	2666	0013826	0198	14424
026	OBS	0102	-0128	3313	2667			14424
	STD	0125	-0114	3324	2675	0012933	0232	14436
	STD	0150	-0069	3341	2688	0011786	0263	14464
026	OBS	T0153	-0062	3343	2689			14468

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4816 N	05157 W		150	81	07	15	042	1963		8712	0183	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		125			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1011	3168	2437	0035691	0000	14865
045		OBS	0000	1011	3168	2437			14865
		STD	0010	0603	3212	2530	0026832	0031	14716
		STD	0020	0286	3246	2590	0021163	0055	14589
045		OBS	0025	0161	3260	2610			14537
		STD	0030	0082	3270	2623	0017958	0075	14503
		STD	0050	-0125	3296	2653	0015091	0108	14415
045		OBS	0050	-0125	3296	2653			14415
		STD	0075	-0144	3301	2658	0014638	0145	14411
045		OBS	0075	-0144	3301	2658			14411
		STD	0100	-0140	3306	2662	0014247	0181	14417
045		OBS	0100	-0140	3306	2662			14417
		STD	0125	-0121	3316	2669	0013522	0216	14432
		STD	0150	-0086	3331	2680	0012483	0248	14454
045		OBS	T0150	-0086	3331	2680			14454

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48255N	05216 W		150	82	07	15	059	1963		8713	0192	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F03		117			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0973	3169	2444	0035025	0000	14852
062		OBS	0000	0973	3169	2444			14852
		STD	0010	0447	3226	2559	0024106	0030	14653
		STD	0020	0073	3267	2621	0018138	0051	14497
062		OBS	0026	-0080	3284	2642			14430
		STD	0030	-0091	3286	2644	0015989	0066	14426
		STD	0050	-0131	3295	2652	0015181	0099	14412
062		OBS	0051	-0132	3295	2652			14411
		STD	0075	-0142	3299	2656	0014813	0136	14411
062		OBS	0076	-0142	3299	2656			14411
		STD	0100	-0140	3302	2658	0014569	0173	14417
062		OBS	0102	-0140	3302	2658			14417
		STD	0125	-0135	3308	2663	0014092	0209	14424
		STD	0150	-0125	3317	2670	0013417	0243	14434
062		OBS	T0153	-0124	3318	2671			14435

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48345N	05237 W		150	82	07	15	079	1963		8714	0293	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F03		122			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0956	3157	2437	0035655	0000	14844
082		OBS	0000	0956	3157	2437			14844
		STD	0010	0438	3204	2542	0025675	0031	14646
		STD	0020	0070	3240	2600	0020180	0054	14492
082		OBS	0025	-0058	3255	2618			14436
		STD	0030	-0080	3264	2626	0017696	0073	14428
		STD	0050	-0137	3290	2649	0015518	0106	14408
082		OBS	0050	-0137	3290	2649			14408
		STD	0075	-0141	3295	2653	0015106	0144	14411
082		OBS	0075	-0141	3295	2653			14411
		STD	0100	-0144	3300	2657	0014696	0181	14415
082		OBS	0100	-0144	3300	2657			14415
		STD	0125	-0142	3303	2659	0014454	0218	14420
		STD	0150	-0134	3313	2667	0013695	0253	14429
082		OBS	0150	-0134	3313	2667			14429
		STD	0200		3358				
082		OBS	0200		3358				

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	48405N	05251 W		150	82	07	15	091	1963		8715	0137	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		22	F03		138			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1109	3150	2406	0038614	0000	14899
093		OBS	0000	1109	3150	2406			14899
		STD	0010	0617	3201	2520	0027819	0033	14720
		STD	0020	0244	3241	2589	0021216	0058	14570
093		OBS	0026	0078	3260	2615			14499
		STD	0030	0029	3267	2624	0017912	0077	14479
		STD	0050	-0137	3292	2650	0015364	0111	14409
093		OBS	0052	-0146	3293	2651			14405
		STD	0075	-0146	3293	2651	0015246	0149	14409
093		OBS	0078	-0146	3293	2651			14409
		STD	0100	-0145	3295	2653	0015077	0187	14413
093		OBS	T0104	-0145	3295	2653			14414

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4844 N	05256 W		150	82	07	15	104	1963		8716	0093	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		25	F03		159			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10[7]	Σ Δ D DYN. M. X 10[3]	SOUND VELOCITY
		STD	0000	1241	3117	2357	0043335	0000	14941
106		OBS	0000	1241	3117	2357			14941
		STD	0010	0652	3184	2502	0029508	0036	14732
		STD	0020	0217	3235	2566	0021473	0062	14557
106		OBS	0027	0005	3261	2620			14466
		STD	0030	-0015	3265	2624	0017865	0082	14458
		STD	0050	-0111	3287	2645	0015822	0115	14420
106		OBS	0053	-0120	3289	2647			14417
		STD	0075	-0131	3292	2650	0015342	0154	14416
106		OBS	T0080	-0133	3293	2651			14415

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4847 N	05246 W		150	82	07	15	120	1963		8717	0165	01

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS.
		22	F02		135			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10[7]	Σ Δ D DYN. M. X 10[3]	SOUND VELOCITY
		STD	0000	1141	3142	2394	0039744	0000	14909
122		OBS	0000	1141	3142	2394			14909
		STD	0010	0667	3181	2498	0029914	0035	14737
		STD	0020	0303	3215	2563	0023645	0062	14592
122		OBS	0025	0162	3230	2586			14533
		STD	0030	0082	3246	2604	0019786	0083	14500
		STD	0050	-0128	3289	2647	0015619	0119	14412
122		OBS	0050	-0128	3289	2647			14412
		STD	0075	-0143	3294	2652	0015177	0157	14410
122		OBS	0075	-0143	3294	2652			14410
		STD	0100	-0142	3300	2657	0014702	0195	14416
122		OBS	0100	-0142	3300	2657			14416
		STD	0125	-0140	3305	2661	0014307	0231	14421
		STD	0150	-0137	3309	2664	0013992	0266	14427
122		OBS	T0150	-0137	3309	2664			14427

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4850 N	05242 W		150	82	07	15	126	1963		8718	0229	02

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		22	F03		135			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1140	3156	2405	0038693	0000	14910
129		OBS	0000	1140	3156	2405			14910
		STD	0010	0921	3160	2445	0034925	0037	14833
		STD	0020	0683	3176	2492	0030497	0070	14745
129		OBS	0024	0582	3186	2512			14706
		STD	0030	0357	3218	2561	0023881	0097	14617
129		OBS	0046	-0086	3282	2640			14431
		STD	0050	-0091	3283	2641	0016192	0137	14429
129		OBS	0072	-0135	3294	2652			14414
		STD	0075	-0135	3295	2652	0015155	0176	14414
129		OBS	0096	-0143	3299	2656			14414
		STD	0100	-0142	3300	2657	0014703	0213	14416
		STD	0125	-0132	3308	2663	0014100	0249	14425
129		OBS	0144	-0125	3317	2670			14433
		STD	0150	-0120	3320	2672	0013204	0283	14437
129		OBS	T0192	-0075	3347	2693			14469

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	STATION TIME (GMT) DAY	STATION TIME (GMT) HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4855 N	05222 W		150	82	07	15	139	1963		8719	0384	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		22	F03		139			

MESSENGER TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	1129	3146	2399	0039246	0000	14905
143		OBS	0000	1129	3146	2399			14905
		STD	0010	0496	3205	2537	0026182	0033	14671
		STD	0020	0056	3249	2608	0019422	0056	14487
143		OBS	0024	-0066	3262	2624			14433
		STD	0030	-0085	3270	2631	0017220	0074	14427
143		OBS	0049	-0129	3289	2647			14412
		STD	0050	-0130	3289	2648	0015591	0107	14411
143		OBS	0073	-0147	3297	2654			14408
		STD	0075	-0147	3298	2655	0014861	0145	14409
143		OBS	0098	-0143	3304	2660			14415
		STD	0100	-0142	3305	2660	0014350	0181	14416
		STD	0125	-0128	3312	2666	0013775	0216	14428
143		OBS	0146	-0117	3319	2671			14438
		STD	0150	-0114	3321	2673	0013148	0250	14440
143		OBS	0195	-0052	3353	2697			14481
		STD	0200	-0029	3360	2701	0010497	0309	14493
		STD	0250	0158	3415	2734	0007475	0354	14594
143		OBS	T0293	0249	3444	2751			14645
		STD	0300	0258	3447	2752	0005903	0388	14650
143		OBS	T0345	0274	3455	2757			14666

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4903 N	05205 W		150	92	07	15	158	1963		8720	0302	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS.
		22	F03		135			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1055	3153	2418	0037504	0000	14880
161		OBS	0000	1055	3153	2418			14880
		STD	0010	0733	3159	2472	0032387	0035	14760
		STD	0020	0458	3175	2517	0028061	0065	14653
161		OBS	0025	0338	3187	2538			14604
		STD	0030	0219	3212	2568	0023233	0091	14557
		STD	0050	-0088	3285	2643	0016049	0130	14431
161		OBS	0050	-0088	3285	2643			14431
161		OBS	0074	-0103	3311	2664			14431
		STD	0075	-0103	3312	2665	0013917	0168	14431
161		OBS	0099	-0103	3325	2676			14437
		STD	0100	-0102	3326	2677	0012834	0201	14438
		STD	0125	-0081	3344	2690	0011521	0231	14454
161		OBS	0148	-0050	3360	2702			14475
		STD	0150	-0046	3361	2703	0010358	0259	14477
161		OBS	T0198	0056	3393	2723			14536
		STD	0200	0061	3394	2724	0008401	0306	14539
		STD	0250	0187	3432	2746	0006414	0343	14609
161		OBS	T0278	0267	3454	2757			14651

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4906 N	05150 W		150	91	07	15	170	1963		8721	0302	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS. CODE	ADD'L OBS.
		22	F03		133			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1094	3152	2410	0038217	0000	14894
173		OBS	0000	1094	3152	2410			14894
		STD	0010	0602	3175	2501	0029593	0034	14710
		STD	0020	0235	3201	2558	0024181	0061	14560
173		OBS	0025	0098	3215	2578			14502
		STD	0030	0034	3237	2599	0020225	0083	14477
173		OBS	0049	-0121	3295	2652			14416
		STD	0050	-0120	3296	2653	0015105	0118	14417
173		OBS	0074	-0107	3313	2666			14430
		STD	0075	-0107	3314	2667	0013750	0154	14430
173		OBS	0098	-0106	3333	2682			14437
		STD	0100	-0105	3334	2683	0012212	0187	14438
		STD	0125	-0075	3350	2695	0011086	0216	14458
173		OBS	0148	-0027	3367	2707			14486
		STD	0150	-0019	3369	2708	0009873	0242	14491
173		OBS	T0197	0138	3411	2733			14575
		STD	0200	0146	3413	2734	0007524	0286	14580
		STD	0250	0231	3439	2748	0006244	0320	14629
173		OBS	T0276	0245	3446	2752			14640

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	49125N	05130 W		150	91	07	15	187	1963		8722	0338	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		20	F02		135			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	1066	3170	2429	0036425	0000	14886
190		OBS	0000	1066	3170	2429			14886
		STD	0010	0898	3216	2492	0030423	0033	14831
		STD	0020	0705	3253	2549	0025022	0061	14763
190		OBS	0024	0622	3266	2570			14733
		STD	0030	0431	3280	2603	0019899	0084	14657
190		OBS	0049	0015	3314	2662			14482
		STD	0050	0007	3315	2663	0014139	0118	14479
190		OBS	0073	-0103	3330	2680			14434
		STD	0075	-0099	3332	2681	0012399	0151	14436
190		OBS	0098	-0048	3355	2698			14467
		STD	0100	-0043	3357	2699	0010693	0180	14470
		STD	0125	0019	3378	2713	0009383	0205	14505
190		OBS	0146	0070	3394	2723			14534
		STD	0150	0081	3397	2725	0008294	0227	14540
190		OBS	0195	0185	3425	2740			14598
		STD	0200	0194	3428	2742	0006751	0264	14603
		STD	0250	0261	3450	2754	0005674	0296	14644
190		OBS	T0293	0281	3462	2762			14661

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4922 N	05100 W		150	91	07	15	209	1963		8723	0347	03

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F03		117			

MESSENGER TIME HR. 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	ΣΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0974	3262	2516	0028144	0000	14864
212		OBS	0000	0974	3262	2516			14864
		STD	0010	0522	3283	2595	0020599	0024	14692
		STD	0020	0192	3301	2641	0016291	0043	14555
212		OBS	0023	0117	3306	2650			14523
		STD	0030	0022	3314	2662	0014292	0058	14482
212		OBS	0046	-0097	3333	2682			14432
		STD	0050	-0084	3339	2686	0011928	0084	14440
212		OBS	0070	-0018	3364	2704			14477
		STD	0075	-0001	3369	2707	0009976	0112	14487
212		OBS	0093	0055	3385	2717			14517
		STD	0100	0076	3392	2721	0008640	0135	14529
		STD	0125	0141	3413	2734	0007470	0155	14565
212		OBS	0140	0175	3424	2740			14584
		STD	0150	0194	3430	2744	0006580	0173	14595
212		OBS	0186	0251	3449	2754			14629
		STD	0200	0267	3455	2758	0005320	0202	14639
		STD	0250	0310	3470	2766	0004617	0227	14667
212		OBS	T0279	0325	3476	2769			14680
		STD	0300	0331	3479	2771	0004182	0249	14686
212		OBS	T0326	0334	3480	2772			14692

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4931 N	05051 W		150	90	07	15	232	1963		8724	0357	03

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		109			

MESSENGER TIME HR 1/10	or CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10^7	Σ ΔD DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0904	3268	2532	0026655	0000	14839
235		OBS	0000	0904	3268	2532			14839
		STD	0010	0670	3272	2569	0023148	0025	14750
		STD	0020	0455	3282	2602	0019981	0046	14666
235		OBS	0025	0354	3288	2617			14625
		STD	0030	0229	3300	2637	0016637	0065	14573
		STD	0050	-0078	3339	2686	0011949	0093	14443
235		OBS	0050	-0078	3339	2686			14443
		STD	0075	-0022	3366	2707	0009954	0121	14477
235		OBS	0075	-0022	3366	2707			14477
		STD	0100	0067	3400	2728	0007979	0143	14526
235		OBS	0100	0067	3400	2728			14526
		STD	0125	0152	3421	2740	0006942	0162	14571
		STD	0150	0214	3437	2748	0006208	0178	14605
235		OBS	0150	0214	3437	2748			14605
		STD	0200	0267	3457	2759	0005170	0207	14639
235		OBS	0200	0267	3457	2759			14639
		STD	0250	0307	3472	2768	0004439	0231	14666
		STD	0300	0335	3483	2774	0003922	0252	14688
235		OBS	T0300	0335	3483	2774			14688

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4940 N	05003 W		150	90	07	16	013	1963		8725	0640	06

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS.
		20	F03		102			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ Δ D DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0654	3253	2556	0024359	0000	14740
019		OBS	0000	0654	3253	2556			14740
		STD	0010	0318	3305	2634	0016963	0021	14609
		STD	0020	0098	3347	2684	0012189	0035	14520
019		OBS	0025	0031	3365	2702			14493
		STD	0030	0052	3376	2712	0009568	0046	14505
		STD	0050	0128	3418	2739	0006986	0063	14548
019		OBS	0050	0128	3418	2739			14548
		STD	0075	0202	3438	2750	0006005	0079	14587
019		OBS	0075	0202	3438	2750			14587
		STD	0100	0242	3451	2757	0005351	0093	14611
019		OBS	0100	0242	3451	2757			14611
		STD	0125	0279	3462	2762	0004850	0106	14632
		STD	0150	0304	3470	2766	0004488	0118	14648
019		OBS	0150	0304	3470	2766			14648
		STD	0200	0321	3475	2769	0004308	0140	14665
019		OBS	T0200	0321	3475	2769			14665
		STD	0250	0329	3479	2771	0004123	0161	14677
		STD	0300	0338	3482	2773	0004026	0181	14689
019		OBS	0300	0338	3482	2773			14689
		STD	0400	0356	3487	2775	0003918	0221	14714
019		OBS	0400	0356	3487	2775			14714
		STD	0500	0351	3486	2776	0003908	0260	14728
		STD	0600	0345	3488	2777	0003896	0299	14743
019		OBS	T0600	0345	3488	2777			14743

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	4950 N	04931 W		149	99	07	16	040	1963		8726	1372	10

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS
		20	F03		091			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	Σ ΔD DYN. M. X 10³	SOUND VELOCITY
		STD	0000	0701	3336	2615	0018749	0000	14769
044		OBS	0000	0701	3336	2615			14769
		STD	0010	0611	3392	2671	0013454	0016	14743
		STD	0020	0534	3434	2713	0009421	0028	14719
044		OBS	0024	0507	3446	2726			14710
		STD	0030	0468	3454	2737	0007206	0036	14696
044		OBS	0048	0387	3469	2757			14667
		STD	0050	0385	3469	2758	0005225	0048	14666
044		OBS	0073	0360	3473	2763			14660
		STD	0075	0358	3473	2764	0004665	0061	14660
044		OBS	0097	0338	3476	2768			14655
		STD	0100	0338	3476	2768	0004298	0072	14656
		STD	0125	0335	3478	2770	0004132	0082	14659
044		OBS	0146	0334	3480	2772			14662
		STD	0150	0334	3480	2772	0004001	0093	14663
044		OBS	T0196	0335	3483	2774			14671
		STD	0200	0335	3483	2774	0003827	0112	14672
		STD	0250	0338	3485	2775	0003743	0131	14681
044		OBS	0294	0340	3487	2777			14690
		STD	0300	0341	3487	2776	0003674	0150	14691
044		OBS	0391	0346	3488	2777			14709
		STD	0400	0346	3488	2777	0003740	0187	14710
		STD	0500	0342	3489	2778	0003737	0224	14725
044		OBS	T0586	0340	3489	2778			14739
		STD	0600	0340	3489	2778	0003762	0262	14741
		STD	0700	0341	3490	2779	0003811	0299	14758
044		OBS	0781	0341	3490	2779			14771
		STD	0800	0341	3490	2779	0003867	0338	14775
		STD	0900	0340	3490	2779	0003936	0377	14791
044		OBS	T0975	0339	3490	2779			14803

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR. 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES
EV	5000 N	04900 W		185	09	07	16	065	1963		8727	1865	15

WATER COLOR CODE	WATER TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER (mbs)	AIR TEMP. °C DRY BULB	AIR TEMP. °C WET BULB	VIS. CODE	ADD'L OBS
		22	F03		092			

MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ Δ D DYN. M. X 10^3	SOUND VELOCITY
		STD	0000	0776	3323	2594	0020715	0000	14797
070		OBS	0000	0776	3323	2594			14797
		STD	0010	0744	3368	2634	0016944	0019	14792
		STD	0020	0692	3404	2670	0013588	0034	14778
070		OBS	0025	0659	3418	2685			14768
		STD	0030	0597	3426	2699	0010770	0046	14745
		STD	0050	0421	3452	2740	0006886	0064	14679
070		OBS	0050	0421	3452	2740			14679
		STD	0075	0367	3468	2759	0005170	0079	14663
070		OBS	0075	0367	3468	2759			14663
		STD	0100	0344	3476	2767	0004370	0091	14658
070		OBS	0100	0344	3476	2767			14658
		STD	0125	0352	3481	2771	0004091	0102	14666
		STD	0150	0355	3484	2773	0003917	0112	14672
070		OBS	0150	0355	3484	2773			14672
		STD	0200	0344	3485	2775	0003777	0131	14676
070		OBS	T0200	0344	3485	2775			14676
		STD	0250	0349	3487	2776	0003719	0149	14686
		STD	0300	0351	3488	2776	0003706	0168	14696
070		OBS	0300	0351	3488	2776			14696
		STD	0400	0346	3488	2777	0003740	0205	14710
070		OBS	0400	0346	3488	2777			14710
		STD	0500	0347	3489	2777	0003754	0243	14727
		STD	0600	0347	3490	2778	0003768	0280	14744
070		OBS	T0600	0347	3490	2778			14744
		STD	0700	0345	3490	2778	0003829	0318	14760
070		OBS	0799	0344	3490	2779			14776
		STD	0800	0344	3490	2779	0003900	0357	14776
		STD	0900	0342	3490	2779	0003958	0396	14792
070		OBS	T0998	0341	3490	2779			14808
		STD	1000	0341	3490	2779	0004027	0436	14808
		STD	1100	0341	3491	2779	0004062	0477	14825
		STD	1200	0341	3491	2780	0004097	0517	14842
		STD	1300	0341	3492	2780	0004131	0559	14859
		STD	1400	0341	3492	2781	0004165	0600	14875
070		OBS	T1497	0341	3493	2781			14892

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5343 N	05548 W		186	35	07	17	157	1963		8728	0113	01	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F03		061				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0647	2805	2205	0057862	0000	14678						
161		OBS	0000	0647	2805	2205			14678		031	052	007	004	
		STD	0010	0051	3158	2535	0026345	0042	14470	928					
161		OBS	0010	0051	3158	2535			14470	928	032	045	004	002	
		STD	0020	-0076	3213	2584	0021624	0066	14421	897					
161		OBS	0024	-0112	3230	2599			14407	883	049	063	003	010	001
		STD	0030	-0126	3240	2608	0019400	0087	14403	848					
161		OBS	0048	-0154	3261	2625			14396	781	091	101	010	050	004
		STD	0050	-0154	3262	2626	0017625	0124	14396	781					
161		OBS	0071	-0156	3270	2633			14400	779	092	112	009	054	006
		STD	0075	-0156	3272	2634	0016833	0167	14401	777					
161		OBS	T0095	-0155	3280	2641			14406	755	096	116	009	064	008

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	53525N	05531 W		186	35	07	17	175	1963		8729	0196	02	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F03		058				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0452	3038	2409	0038314	0000	14629						
178		OBS	0000	0452	3038	2409			14629		038	062	004	002	002
		STD	0010	0162	3150	2522	0027562	0033	14520	892					
178		OBS	0010	0162	3150	2522			14520	892	043	064	004	001	002
		STD	0020	0038	3211	2578	0022232	0058	14474	873					
178		OBS	0025	-0011	3233	2598			14455	862	068	076	007	030	004
		STD	0030	-0043	3241	2606	0019589	0079	14442	843					
178		OBS	0049	-0123	3268	2630			14412	788	093	107	010	071	008
		STD	0050	-0124	3269	2631	0017165	0115	14411	787					
178		OBS	0074	-0131	3290	2648			14415	763	094				008
		STD	0075	-0131	3291	2649	0015441	0156	14415	763					
178		OBS	0098	-0125	3307	2662			14424	754	097	110	009	072	008
		STD	0100	-0124	3308	2663	0014141	0193	14425	754					
		STD	0125	-0112	3322	2674	0013094	0227	14437	754					
178		OBS	0148	-0100	3337	2685			14448	754	091	092	010	084	007
		STD	0150	-0098	3338	2686	0011904	0259	14450	753					
178		OBS	T0187	-0046	3367	2708			14484	705	108	115	012	115	013

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5358 N	05523 W		186	35	07	17	188	1963		8730	0174	01	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F02		055				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10^7	ΣΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0431	3006	2386	0040534	0000	14615						
190		OBS	0000	0431	3006	2386			14615		035	051	004	001	001
		STD	0010	0235	3063	2448	0034651	0038	14540	862					
190		OBS	0010	0235	3063	2448			14540	862	060	087	005	003	002
		STD	0020	0016	3182	2556	0024347	0067	14459	863					
190		OBS	0025	-0061	3224	2593			14430	864	057	063	006	013	002
		STD	0030	-0079	3231	2599	0020228	0089	14424	851					
		STD	0050	-0126	3258	2622	0018003	0128	14409	806					
190		OBS	0050	-0126	3258	2622			14409		083	089	009	043	005
190		OBS	0074	-0128	3288	2647			14416	770	097	101	009	072	007
		STD	0075	-0128	3289	2647	0015603	0170	14417	769					
190		OBS	0099	-0122	3311	2665			14426	754	103	109	012	086	009
		STD	0100	-0122	3312	2666	0013843	0206	14427	754					
		STD	0125	-0110	3327	2678	0012718	0240	14439	745					
190		OBS	T0149	-0098	3336	2685			14449	744	089	091	009	059	008

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	54085N	05509 W		186	45	07	17	205	1963		8731	0174	01	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F03		053				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	ΣΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0473	3109	2463	0033165	0000	14647						
208		OBS	0000	0473	3109	2463			14647		036	053	003	004	001
		STD	0010	0489	3115	2466	0032879	0033	14656	777					
208		OBS	0010	0489	3115	2466			14656	777	039	039	003	004	001
		STD	0020	0153	3209	2570	0023019	0061	14525	827					
208		OBS	0025	0031	3244	2605			14476	852	058	067	008	016	002
		STD	0030	-0009	3255	2616	0018655	0082	14460	840					
		STD	0050	-0112	3290	2648	0015589	0116	14420	800					
208		OBS	0050	-0112	3290	2648			14420	800	083	095	012	063	005
208		OBS	0074	-0114	3318	2670			14427	771	089	095	010	070	007
		STD	0075	-0113	3319	2671	0013348	0152	14428	770					
208		OBS	0099	-0101	3341	2689			14440	742	100	109	012	082	009
		STD	0100	-0101	3342	2689	0011614	0183	14441	741					
		STD	0125	-0099	3364	2707	0009926	0210	14449	705					
208		OBS	T0149	-0097	3384	2723			14457	664	087	101	006	077	009

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	54195N	05446 W		186	44	07	17	225	1963		8732	0196	02	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F03		048				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	ΣΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0387	3166	2517	0028058	0000	14618						
228		OBS	0000	0387	3166	2517			14618		038	048	003	005	001
		STD	0010	0380	3170	2521	0027698	0028	14617	794					
228		OBS	0010	0380	3170	2521			14617	794	037	052	004	004	001
		STD	0020	0046	3228	2591	0020973	0052	14480	820					
228		OBS	0026	-0088	3253	2617			14422	835	055	063	004	019	001
		STD	0030	-0093	3258	2621	0018115	0072	14421	825					
		STD	0050	-0115	3281	2641	0016271	0106	14417	786					
228		OBS	0051	-0116	3282	2641			14417	785	071	083	006	048	004
		STD	0075	-0105	3309	2663	0014142	0144	14430	771					
228		OBS	0076	-0104	3310	2664			14431	770	071	071	007	048	004
		STD	0100	-0105	3330	2680	0012518	0177	14437	756					
228		OBS	0102	-0105	3332	2682			14438	755	072	088	006	051	004
		STD	0125	-0090	3350	2696	0011029	0207	14451	744					
		STD	0150	-0058	3367	2708	0009848	0233	14473	736					
228		OBS	T0153	-0053	3369	2709			14476	735	095	101	011	092	009

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5426 N	05423 W		186	44	07	18	002	1963		8733	0223	02	36			1	X1		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F03		049				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	ΣΔD DYN. M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0339	3102	2470	0032481	0000	14589						
005		OBS	0000	0339	3102	2470			14589		042	065	005	006	
		STD	0010	0236	3132	2503	0029420	0031	14550	864					
005		OBS	0010	0236	3132	2503			14550	864	046	066	005	009	004
		STD	0020	0012	3222	2588	0021272	0056	14463	836					
005		OBS	0025	-0066	3254	2617			14432	823	078	091	009	045	
		STD	0030	-0081	3261	2623	0017922	0076	14427	811					
		STD	0050	-0120	3286	2645	0015672	0110	14416	777					
005		OBS	0050	-0120	3286	2645			14416	777	092	105	011	073	007
		STD	0075	-0117	3313	2667	0013795	0147	14425	762					
005		OBS	0075	-0117	3313	2667			14425	762	094	112	012	077	008
		STD	0100	-0103	3328	2678	0012676	0180	14438	764					
005		OBS	0100	-0103	3328	2678			14438	764	092	100	012	088	009
		STD	0125	-0088	3345	2691	0011418	0210	14451	760					
		STD	0150	-0061	3361	2703	0010293	0237	14470	752					
005		OBS	0150	-0061	3361	2703			14470	752	101	124	015	092	
		STD	0200	0028	3390	2723	0008512	0284	14524	727					
005		OBS	T0200	0028	3390	2723			14524	727	104	123	025	090	009

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	54435N	05352 W		186	43	07	18	028	1963		8734	0315	03	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F03		048				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN M X 10³	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0268	3207	2560	0023968	0000	14572						
032		OBS	0000	0268	3207	2560			14572		054	083	008		004
		STD	0010	0270	3214	2565	0023456	0024	14576	849					
032		OBS	0010	0270	3214	2565			14576	849	042	077	006	006	003
		STD	0020	0008	3291	2644	0015984	0043	14471	808					
032		OBS	0025	-0080	3317	2669			14435	793	073	105	011	050	005
		STD	0030	-0086	3321	2672	0013309	0056	14433	787					
032		OBS	0049	-0101	3333	2682			14431	772	079	088	010	064	006
		STD	0050	-0101	3333	2683	0012296	0084	14431	772					
032		OBS	0074	-0101	3343	2690			14437	765	079	098	012	068	006
		STD	0075	-0100	3344	2691	0011514	0113	14437	765					
032		OBS	0079	-0085	3355	2699			14450	758	072	075	009	055	005
		STD	0100	-0082	3356	2700	0010611	0141	14452	758					
		STD	0125	-0015	3375	2713	0009441	0166	14489	750					
032		OBS	0148	0037	3391	2723			14519	741	078	083	016	078	006
		STD	0150	0040	3392	2724	0008431	0189	14521	740					
032		OBS	0197	0117	3416	2738			14567	719	079	083	015	079	006
		STD	0200	0122	3417	2739	0007055	0227	14570	718					
		STD	0250	0203	3440	2751	0005938	0260	14617	701					
032		OBS	T0296	0277	3456	2759			14659	691	076	094	017	098	006

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	54505N	05337 W		186	43	07	18	045	1963		8735	0605	05	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F02		050				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN M X 10³	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0324	3278	2612	0019049	0000	14606						
055		OBS	0000	0324	3278	2612			14606		028	060	005	005	001
		STD	0010	0158	3368	2697	0010972	0015	14548	807					
055		OBS	0010	0158	3368	2697			14548	807	049	071	008	045	003
		STD	0020	0037	3378	2712	0009489	0025	14496	761					
055		OBS	0025	0001	3382	2718			14481	744	073	089	012	054	005
		STD	0030	0008	3385	2720	0008808	0034	14486	739					
		STD	0050	0058	3400	2729	0007927	0051	14514	723					
055		OBS	0050	0058	3400	2729			14514	723	082	089	015	088	007
		STD	0075	0169	3427	2743	0006593	0069	14571	714					
055		OBS	0075	0169	3427	2743			14571	714	083	088	019	094	006
		STD	0100	0197	3438	2750	0006008	0085	14589	703					
055		OBS	0101	0198	3438	2750			14590	703	073	073	012	064	004
		STD	0125	0218	3445	2752	0005775	0100	14603	711					
		STD	0150	0242	3450	2756	0005455	0114	14619	712					
055		OBS	0150	0242	3450	2756			14619	712	082	089	017	078	006
		STD	0200	0302	3466	2763	0004830	0139	14655	691					
055		OBS	0201	0303	3466	2763			14656	691	085	084	013	116	007
		STD	0250	0336	3473	2766	0004614	0163	14679	687					
		STD	0300	0369	3481	2769	0004432	0186	14702	682					
055		OBS	T0302	0370	3481	2769			14703	682	091	094	008	126	007
049		OBS	T0328	0371	3486	2773			14709	683	094	096	007	119	008
		STD	0400	0383	3487	2772	0004223	0229	14726	683					
049		OBS	0423	0385							086	092	003	111	007
		STD	0500	0385	3488	2773	0004255	0271	14743	684					
049		OBS	T0521	0383	3488	2773			14746	684	083	086	004	117	006

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT.	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5458 N	05328 W		186	43	07	18	066	1963		8736	1536	15	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F02		053				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	$\Sigma \Delta D$ DYN. M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0443	3390	2689	0011721	0000	14672						
072		OBS	0000	0443	3390	2689			14672		038		009	026	002
		STD	0010	0421	3391	2692	0011433	0012	14664	809					
072		OBS	0010	0421	3391	2692			14664	809	038	074	010	029	002
		STD	0020	0413	3425	2720	0008806	0022	14667	780					
072		OBS	0025	0409	3438	2731			14668	768	058	082	013	069	004
		STD	0030	0402	3446	2738	0007127	0030	14667	759					
		STD	0050	0380	3469	2758	0005199	0042	14664	731					
072		OBS	0051	0379	3470	2759			14664	730	067	095	019	077	004
		STD	0075	0369	3475	2764	0004682	0054	14665	721					
072		OBS	0076	0369	3475	2764			14665	720	065	084	021	083	004
		STD	0100	0376	3485	2771	0004030	0065	14673	701					
072		OBS	0101	0376	3485	2771			14673	700	093	109	029	134	007
		STD	0125	0377	3486	2772	0003931	0075	14678	695					
		STD	0150	0378	3488	2773	0003851	0085	14682	689					
072		OBS	0151	0378	3488	2774			14683	689	092	103	007	132	007
		STD	0200	0377	3488	2774	0003880	0104	14690	686					
072		OBS	0202	0377	3488	2774			14691	686	094	105	005	139	007
		STD	0250	0376	3488	2774	0003915	0124	14698	688					
		STD	0300	0375	3488	2774	0003951	0143	14706	691					
072		OBS	T0302	0375	3488	2774			14706	691	094	115	004	164	009
		STD	0400	0375	3488	2774	0004041	0183	14722	691					
083		OBS	T0410	0375	3488	2774			14724	691	105		006	164	009
		STD	0500	0373	3488	2774	0004113	0224	14738	693					
083		OBS	0513	0373	3488	2774			14740	693	086	097	010	118	005
		STD	0600	0370	3489	2775	0004099	0265	14754	696					
083		OBS	0615	0369	3489	2775			14756	697	081	108	004	104	005
		STD	0700	0363	3489	2776	0004072	0306	14767	697					
		STD	0800	0359	3490	2777	0004075	0347	14782	698					
083		OBS	0820	0358	3490	2777			14785	698	083	129	003	105	004
		STD	0900	0357	3490	2777	0004132	0388	14798	698					
		STD	1000	0356	3490	2777	0004205	0429	14815	697					
083		OBS	1025	0356	3490	2777			14819	697	098	112	006	107	008
		STD	1100	0354	3490	2778	0004260	0472	14830	693					
		STD	1200	0351	3490	2778	0004305	0515	14846	690					
083		OBS	1230	0350	3490	2778			14850	689	091	094	004	126	007
		STD	1300		3490					691					
		STD	1400		3491					693					
		STD	1500		3491					695					
083		OBS	1537		3491					696	107	115	004	166	010

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	55005N	05316 W		186	53	07	18	098	1963		8737	2103	20	02			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		02	F02		055				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0520	3447	2725	0008265	0000	14711						
101		OBS	0000	0520	3447	2725			14711		062	097	016	070	005
		STD	0010	0520	3447	2725	0008277	0008	14713	771					
101		OBS	0010	0520	3447	2725			14713	771	067	093	019	084	005
		STD	0020	0511	3452	2730	0007813	0016	14712	758					
101		OBS	0026	0500	3456	2735			14709	751	090	117	032	095	008
		STD	0030	0479	3462	2742	0006724	0024	14701	746					
		STD	0050	0404	3483	2767	0004385	0035	14676	726					
101		OBS	0052	0400	3484	2768			14675	725	089	112	033	130	008
		STD	0075	0392	3486	2770	0004078	0045	14676	719					
101		OBS	0078	0391	3486	2771			14676	718	102	145	032	144	008
		STD	0100	0380	3488	2773	0003840	0055	14675	706					
101		OBS	0104	0378	3488	2774			14675	704	100	116	017	150	008
		STD	0125	0376	3488	2774	0003773	0065	14678	702					
		STD	0150	0374	3489	2775	0003739	0074	14681	700					
101		OBS	0154	0374	3489	2775			14682	700	104	122	005	130	009
		STD	0200	0373	3488	2774	0003833	0093	14689	695					
101		OBS	0206	0373	3488	2774			14690	694	104	112	005	167	
		STD	0250	0370	3489	2775	0003787	0112	14696	698					
		STD	0300	0367	3490	2776	0003730	0131	14703	702					
101		OBS	T0309	0366	3490	2776			14704	703	094	111	028	152	008
112		OBS	T0378	0369	3490	2776			14717	693	104	117	003	165	009
		STD	0400	0366	3490	2776	0003798	0168	14719	694					
112		OBS	0477	0362	3490	2777			14730	696	107	123		149	009
		STD	0500	0364	3490	2777	0003864	0207	14735	701					
112		OBS	0578	0368	3490	2776			14749	712	102	129	004	164	008
		STD	0600	0366	3490	2776	0003974	0246	14752	709					
		STD	0700	0358	3490	2777	0003972	0286	14765	698					
112		OBS	0785	0353	3490	2778			14777	692	105	116	006	165	009
		STD	0800	0352	3490	2778	0003982	0325	14779	692					
		STD	0900	0348	3491	2779	0003989	0365	14794	690					
		STD	1000	0346	3491	2779	0004011	0405	14810	689					
112		OBS	T1000	0346	3491	2779			14810	689	103	107	002	136	010
		STD	1100	0349	3491	2779	0004125	0446	14828	697					
		STD	1200	0352	3491	2779	0004241	0488	14846	705					
112		OBS	1206	0352	3491	2779			14847	705	106	109	004	172	010
		STD	1300	0350	3491	2779	0004278	0530	14862	699					
		STD	1400	0347	3492	2779	0004298	0573	14878	692					
		STD	1500	0343	3492	2780	0004304	0616	14893	684					
112		OBS	T1519	0342	3492	2780			14896	682	106	111	003	136	011
		STD	1750	0326	3493	2783	0004193	0723	14928	660					
112		OBS	T1954	0306	3494	2785			14955	638	102	110	004	158	011

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5513 N	05259 W		186	52	07	18	130	1963		8738	3109	29	32			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		34	F02		067				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	Σ ΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0605	3455	2721	0008658	0000	14747						
134		OBS	0000	0605	3455	2721			14747		056	082	013	059	005
		STD	0010	0604	3455	2721	0008659	0009	14748	769					
134		OBS	0010	0604	3455	2721			14748	769	056	091	011	052	005
		STD	0020	0577	3463	2731	0007750	0017	14740	750					
134		OBS	0025	0559	3467	2736			14734	742	059	090	014	067	005
		STD	0030	0521	3470	2743	0006589	0024	14720	739					
		STD	0050	0416	3480	2763	0004732	0035	14681	727					
134		OBS	0052	0409	3481	2765			14678	726	083	087	028	087	007
		STD	0075	0388	3484	2769	0004188	0047	14674	747					
134		OBS	0077	0386	3484	2770			14673	748	087	094	036	114	007
		STD	0100	0372	3486	2772	0003903	0057	14671	743					
134		OBS	0103	0371	3486	2773			14671	742	097	106	038	119	008
		STD	0125	0368	3487	2774	0003804	0066	14674	733					
		STD	0150	0365	3488	2775	0003725	0076	14677	722					
134		OBS	0154	0364	3488	2775			14677	720	104	114	006	166	009
		STD	0200	0360	3489	2776	0003646	0094	14683	694					
134		OBS	0205	0360	3489	2776			14684	693	104	106	005	138	009
		STD	0250	0360	3489	2776	0003678	0112	14691	713					
		STD	0300	0360	3489	2776	0003722	0131	14700	725					
134		OBS	T0308	0360	3489	2776			14701	726	107	127	004	126	009
153		OBS	T0391	0360	3489	2776			14715	719	103	144	006	128	009
		STD	0400	0360	3489	2776	0003810	0169	14716	716					
153		OBS	0489	0358						700	110	141	007	139	
		STD	0500	0358	3490	2777	0003831	0207	14732	702					
153		OBS	0585	0358	3490	2777			14746	712	105	113	003	142	010
		STD	0600	0358	3490	2777	0003879	0245	14749	709					
		STD	0700	0355	3491	2778	0003894	0284	14764	696					
153		OBS	0776	0353	3491	2778			14776	690	109	112	003	168	
		STD	0800	0352	3491	2778	0003930	0323	14779	690					
		STD	0900	0349	3490	2778	0004060	0363	14795	690					
153		OBS	T0970	0347	3489	2777			14805	690	108	116	003	171	010
		STD	1000	0346	3489	2778	0004144	0404	14810	696					
		STD	1100	0343	3490	2778	0004152	0446	14826	708					
153		OBS	1165	0342	3490	2779			14837	712	107	116	004	146	010
		STD	1200	0342	3490	2779	0004197	0487	14842	708					
		STD	1300	0342	3490	2779	0004275	0530	14859	696					
		STD	1400	0341	3490	2779	0004341	0573	14875	685					
153		OBS	1465	0340	3490	2779			14886	679	107	118	003	170	010
		STD	1500	0339	3491	2780	0004319	0616	14891	676					
		STD	1750	0331	3493	2782	0004256	0723	14931	662					
153		OBS	T1969	0317	3494	2784			14962	655	117	124	007	154	012
		STD	2000	0315	3494	2784	0004155	0829	14966	655					
159		OBS	T2471	0265	3491	2787			15025	658	106	117	001	155	013
		STD	2500	0261	3491	2787	0003957	1031	15025	659					
159		OBS	T2939	0176	3495	2796			15068	662	10[illegible]	108	004	133	[illegible]

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5530 N	05227 W		186	52	07	18	184	1963		8739	3310	32	34			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		34	F01		063				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10⁷	ΣΔD DYN M X 10³	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0660	3454	2713	0009416	0000	14769						
187		OBS	0000	0660	3454	2713			14769		046	076	014	063	003
		STD	0010	0655	3457	2716	0009144	0009	14769	732					
187		OBS	0010	0655	3457	2716			14769	732	046	070	013	055	003
		STD	0020	0633	3459	2721	0008732	0018	14762	731					
187		OBS	0025	0614	3460	2724			14755	730	046	083	018	062	003
		STD	0030	0569	3463	2732	0007706	0026	14738	732					
		STD	0050	0440	3473	2755	0005543	0040	14690	742					
187		OBS	0051	0436	3473	2755			14688	742	080	095	022	094	007
		STD	0075	0397	3482	2766	0004444	0052	14677	754					
187		OBS	0076	0396	3482	2767			14677	754	089	105	028	098	008
		STD	0100	0381	3484	2770	0004142	0063	14675	764					
187		OBS	0102	0380	3484	2770			14675	765	093	101	037	106	008
		STD	0125	0372	3485	2772	0003994	0073	14675	733					
		STD	0150	0365	3486	2773	0003872	0083	14677	709					
187		OBS	0152	0364	3486	2773			14677	708	103	107	036	156	009
		STD	0200	0350	3488	2776	0003626	0102	14679	701					
187		OBS	0204	0349	3488	2776			14679	700	104	114	009	165	009
		STD	0250	0347	3488	2777	0003626	0120	14686	696					
		STD	0300	0345	3488	2777	0003648	0138	14693	691					
187		OBS	T0306	0345	3488	2777			14694	690	110	116	004	168	010
		STD	0400	0343	3489	2778	0003635	0174	14709	691					
209		OBS	T0400	0343	3489	2778			14709	691					
		STD	0500	0346	3489	2778	0003749	0211	14727	713					
209		OBS	0500	0346	3489	2778			14727	713	108		006	170	010
209		OBS	0599	0342	3490	2779			14742	694	107		004	158	010
		STD	0600	0342	3490	2779	0003715	0249	14742	694					
		STD	0700	0342	3490	2778	0003834	0286	14758	694					
209		OBS	0798	0342	3489	2778			14775	694	110	137	007	154	010
		STD	0800	0342	3489	2778	0003952	0325	14775	694					
		STD	0900	0342	3489	2778	0004033	0365	14792	698					
209		OBS	T0998	0341	3489	2778			14808	701	107	112	005	169	010
		STD	1000	0341	3489	2778	0004101	0406	14808	701					
		STD	1100	0338	3489	2778	0004182	0447	14823	694					
209		OBS	1198	0336	3488	2778			14839	691	096	117	005	136	008
		STD	1200	0336	3488	2778	0004273	0490	14839	691					
		STD	1300	0336	3488	2778	0004331	0533	14856	697					
		STD	1400	0337	3489	2778	0004383	0576	14873	704					
209		OBS	1499	0337	3489	2778			14890	710	096	108	003	132	008
		STD	1500	0337	3489	2778	0004441	0620	14890	710					
		STD	1750	0336	3492	2780	0004433	0731	14932	683					
		STD	2000	0335	3494	2783	0004423	0842	14975	655					
209		OBS	T2002	0335	3494	2783			14975	655	086	089	002	107	008
193		OBS	2460	0299	3494	2786			15038	655	097	105	003	111	009
		STD	2500	0295	3494	2786	0004207	1058	15043	656					
193		OBS	T2953	0229	3492	2791			15093	672	095	100	005	107	009
		STD	3000	0220	3492	2791	0003542	1251	15097	675					
193		OBS	3247	0162	3490	2794			15115	694					

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	55515N	05142 W		186	51	07	19	007	1963		8740	3560	36	29			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		29	F01		055				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X 10⁷	ΣΔD DYN M X 10³	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0714	3459	2710	0009746	0000	14791						
011		OBS	0000	0714	3459	2710			14791		047	079	016	052	
		STD	0010	0714	3458	2709	0009837	0010	14792	721					
011		OBS	0010	0714	3458	2709			14792	721	042	063	016	050	002
		STD	0020	0703	3459	2711	0009655	0020	14790	720					
011		OBS	0025	0693	3459	2713			14787	719	047	077	014	051	001
		STD	0030	0673	3460	2716	0009181	0029	14780	714					
		STD	0050	0591	3464	2730	0007884	0046	14751	700					
011		OBS	0050	0591	3464	2730			14751	700	077	110	028	090	004
		STD	0075	0482	3468	2746	0006358	0064	14711	691					
011		OBS	0075	0482	3468	2746			14711	691	099	128	030	128	008
		STD	0100	0444	3469	2751	0005900	0079	14699	693					
011		OBS	0100	0444	3469	2751			14699	693	084	088	018	101	007
		STD	0125	0413	3473	2758	0005301	0093	14691	681					
		STD	0150	0389	3476	2763	0004855	0106	14685	678					
011		OBS	0150	0389	3476	2763			14685	678	089	096	014	116	007
		STD	0200	0365	3480	2768	0004359	0129	14684	697					
011		OBS	0200	0365	3480	2768			14684	697	090	094	015	112	006
		STD	0250	0361	3484	2772	0004063	0150	14691	685					
		STD	0300	0358	3486	2774	0003927	0170	14698	678					
011		OBS	T0300	0358	3486	2774			14698	678	111	122	005	163	009
		STD	0400	0358	3487	2775	0003939	0209	14715	676					
035		OBS	T0402	0358	3487	2775			14715	676	121	129	005	166	010
		STD	0500	0348	3486	2775	0003996	0249	14727	686					
035		OBS	0502	0348	3486	2775			14728	686	109	117	004	162	010
		STD	0600	0344	3488	2777	0003886	0288	14742	689					
035		OBS	0601	0344	3488	2777			14743	689	113	122	002	152	010
		STD	0700	0343	3488	2777	0003956	0328	14759	690					
		STD	0800	0342	3488	2777	0004026	0367	14775	690					
035		OBS	0800	0342	3488	2777			14775	690	109	108	002	140	010
		STD	0900	0340	3489	2778	0004047	0408	14791	690					
035		OBS	T0997	0339	3489	2778			14807	690	103	130	000	139	010
		STD	1000	0339	3489	2778	0004078	0448	14807	690					
		STD	1100	0340	3489	2778	0004162	0490	14824	690					
035		OBS	1196	0340	3489	2778			14840	689	113	118	004	163	010
		STD	1200	0340	3489	2778	0004247	0532	14841	689					
		STD	1300	0339	3489	2778	0004316	0574	14858	691					
		STD	1400	0339	3489	2778	0004386	0618	14874	694					
035		OBS	1499	0338	3489	2778			14890	696	110	113	002	160	010
		STD	1500	0338	3489	2778	0004453	0662	14891	696					
		STD	1750	0339	3492	2780	0004466	0774	14933	675					
		STD	2000	0339	3494	2782	0004477	0885	14976	653					
035		OBS	T2001	0339	3494	2782			14977	653	121	123	003	158	012
019		OBS	2410	0313	3494	2785			15036	655	108	116	004	160	013
		STD	2500	0309	3494	2785	0004407	1108	15049	655					
019		OBS	2892	0270	3494	2789			15100	655	108	114	005	148	015
		STD	3000	0240	3494	2791	0003692	1310	15106	661					
019		OBS	T3373	0170	3492	2795			15141	696	101	106	002	138	011
019		OBS	3567	0154											

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	56265N	05034 W		186	60	07	19	092	1963		8741	3658	35	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F02		061				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN M X 10³	SOUND VELOCITY	O₂ ml/l	PO₄—P µg-at/l	TOTAL—P µg-at/l	NO₂—N µg-at/l	NO₃—N µg-at/l	SiO₄-Si µg-at/l
		STD	0000	0682	3459	2714	0009326	0000	14778						
095		OBS	0000	0682	3459	2714			14778		039	057	010	050	001
		STD	0010	0684	3459	2714	0009367	0009	14781	725					
095		OBS	0010	0684	3459	2714			14781	725					
		STD	0020	0681	3459	2714	0009340	0019	14781	728					
095		OBS	0025	0679	3459	2715			14781	729					
		STD	0030	0634	3460	2722	0008669	0028	14764	723					
		STD	0050	0499	3465	2742	0006756	0043	14713	700					
095		OBS	0051	0494	3465	2743			14711	699					
		STD	0075	0435	3470	2753	0005719	0059	14692	677					
095		OBS	0076	0433	3470	2753			14691	676	086	094	016	091	
		STD	0100	0412	3473	2758	0005281	0072	14686	692					
095		OBS	0102	0410	3473	2758			14686	693	080	091	011	082	004
		STD	0125	0396	3475	2762	0004955	0085	14684	675					
		STD	0150	0384	3478	2765	0004669	0097	14684	664					
095		OBS	0152	0383	3478	2765			14684	663	107	120	009	160	010
		STD	0200	0369	3484	2771	0004137	0119	14686	666					
095		OBS	0204	0368	3484	2771			14687	667	080	088	004	100	005
		STD	0250	0352	3484	2773	0004003	0140	14687	683					
		STD	0300	0343	3483	2773	0003993	0160	14692	692					
095		OBS	T0306	0342	3483	2773			14692	693	099	111	000	100	006
		STD	0400	0351	3487	2775	0003892	0199	14712	687					
115		OBS	T0407	0352	3487	2775			14714	686	109	114	002	156	010
		STD	0500	0343	3487	2776	0003867	0238	14725	689					
115		OBS	0509	0342	3487	2776			14726	690	093	104	003	110	006
		STD	0600	0340	3487	2776	0003919	0277	14741	699					
115		OBS	0610	0340	3487	2777			14742	700	091	089	003	096	004
		STD	0700	0341	3488	2777	0003945	0316	14758	699					
		STD	0800	0343	3489	2778	0003968	0356	14775	698					
115		OBS	0814	0343	3489	2778			14778	698	095	104	003	110	
		STD	0900	0343	3489	2778	0004048	0396	14792	696					
		STD	1000	0344	3489	2778	0004134	0437	14809	693					
115		OBS	T1017	0344	3489	2778			14812	692	101	109	007	141	008
		STD	1100	0342	3489	2778	0004187	0478	14825	695					
		STD	1200	0339	3489	2778	0004230	0520	14840	697					
115		OBS	1220	0338	3489	2778			14844	698	084	100	002	114	
		STD	1300	0338	3489	2778	0004294	0563	14857	699					
		STD	1400	0337	3489	2778	0004362	0606	14873	699					
		STD	1500	0336	3489	2778	0004431	0650	14890	700					
115		OBS	1526	0336	3489	2778			14894	700	097	121	004	134	007
		STD	1750	0340	3491	2780	0004537	0762	14934	673					
		STD	2000	0344	3493	2781	0004645	0877	14979	657					
115		OBS	T2036	0345	3493	2781			14985	656	084	105	001	133	006
		STD	2500	0321	3494	2784	0004580	1108	15054	667					
102		OBS	T2500	0321	3494	2784			15054	667	103	106	002	096	008
102		OBS	T2993	0283	3494	2787			15123	655	085	084	002	067	006
		STD	3000	0282	3494	2788	0004318	1330	15124	656					
102		OBS	T3484	0197	3490	2792			15172	691	090	103	002	106	006

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5700 N	04929 W		185	79	07	19	163	1963		8742	3658	36	36			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		36	F01		072				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN M X 10³	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SIO_4—Si µg-at/l
		STD	0000	0723	3459	2708	0009867	0000	14794						
166		OBS	0000	0723	3459	2708			14794		046	083	014	064	002
		STD	0010	0707	3459	2711	0009670	0010	14790	721					
166		OBS	0010	0707	3459	2711			14790	721	045	076	014	074	002
		STD	0020	0704	3459	2711	0009650	0019	14790	721					
166		OBS	0025	0703	3459	2711			14790	721	053		019	061	002
		STD	0030	0660	3460	2718	0009029	0029	14774	716					
		STD	0050	0525	3463	2737	0007198	0045	14724	698					
166		OBS	0051	0520	3463	2738			14722	697	089	107	025	118	
		STD	0075	0445	3470	2752	0005832	0061	14696	697					
166		OBS	0076	0443	3470	2752			14695	697	084	100	018	112	006
		STD	0100	0399	3471	2758	0005291	0075	14681	691					
166		OBS	0103	0395	3471	2758			14680	690	098	122	017	192	007
		STD	0125	0388	3475	2762	0004896	0088	14681	671					
		STD	0150	0382	3480	2766	0004522	0100	14683	658					
166		OBS	0153	0381	3480	2767			14683	657	104	123	005	134	007
		STD	0200	0372	3483	2770	0004219	0122	14687	661					
166		OBS	0204	0371	3483	2770			14688	661	091	106	002	119	006
		STD	0250	0362	3485	2773	0004013	0142	14692	666					
		STD	0300	0357	3487	2775	0003864	0162	14698	671					
166		OBS	T0307	0356	3487	2775			14699	672	097	109	001	115	006
190		OBS	T0399	0355	3488	2776			14714	678	084	094	001	133	005
		STD	0400	0355	3488	2776	0003833	0200	14714	678					
		STD	0500	0348	3488	2777	0003845	0239	14728	688					
190		OBS	0500	0348	3488	2777			14728	688	094	106	002	128	006
		STD	0600	0346	3489	2778	0003832	0277	14743	690					
190		OBS	0600	0346	3489	2778			14743	690	089	100	001	116	005
		STD	0700	0345	3489	2778	0003898	0316	14759	693					
		STD	0800	0343	3489	2778	0003963	0355	14775	696					
190		OBS	0802	0343	3489	2778			14776	696	080	096	002	088	004
		STD	0900	0341	3489	2778	0004059	0395	14791	696					
		STD	1000	0339	3488	2777	0004153	0436	14807	696					
190		OBS	T1005	0339	3488	2777			14808	696	094	107	002	125	006
		STD	1100	0339	3489	2778	0004188	0478	14824	694					
		STD	1200	0338	3489	2778	0004223	0520	14840	691					
190		OBS	1207	0338	3489	2778			14841	691	089	089	003	109	005
		STD	1300	0338	3489	2778	0004319	0563	14857	691					
		STD	1400	0337	3488	2778	0004414	0606	14875	691					
		STD	1500	0337	3488	2778	0004514	0651	14890	691					
190		OBS	1511	0337	3488	2778			14892	691	092	108	002	109	005
		STD	1750	0341	3491	2779	0004547	0764	14934	670					
		STD	2000	0345	3494	2781	0004570	0878	14979	656					
190		OBS	T2016	0345	3494	2782			14982	655	087	099	000	109	006
175		OBS	T2481	0317	3493	2783			15049	649	092	100	000	124	008
		STD	2500	0316	3493	2784	0004580	1107	15052	647					
175		OBS	2976	0276	3492	2786			15117	638	082	088	001	096	007
		STD	3000	0271	3492	2787	0004296	1329	15119	643					
175		OBS	T3475	0182	3490	2793			15164	696	098	115	001	112	011
175		OBS	3624	0158	3489	2794			15179	698	076	086	002	114	007

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5734 N	04817 W		185	78	07	20	003	1963		8743	3493	31	00			0	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
			F00		050				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN M X 10³	SOUND VELOCITY	O₂ ml/l	PO₄—P µg-at/l	TOTAL—P µg-at/l	NO₂—N µg-at/l	NO₃—N µg-at/l	SIO₄ Si µg-at/l
		STD	0000	0697	3467	2716	0008925	0000	14785						
006		OBS	0000	0697	3467	2716			14785		065	086	013	098	
		STD	0010	0696	3466	2718	0009003	0009	14786	735					
006		OBS	0010	0696	3466	2718			14786	735	068	106	013	093	005
		STD	0020	0684	3467	2720	0008809	0018	14783	733					
006		OBS	0025	0668	3467	2722			14778	732	062	081	013	074	004
		STD	0030	0617	3469	2731	0007801	0026	14759	731					
		STD	0050	0475	3474	2752	0005803	0040	14705	728					
006		OBS	0052	0466	3475	2754			14701	728	080	089	010	070	
		STD	0075	0441	3481	2761	0004979	0053	14696	725					
006		OBS	0077	0440	3481	2761			14695	725	079	091	018	082	
		STD	0100	0434	3482	2763	0004827	0066	14697	721					
006		OBS	0103	0433	3482	2763			14697	720	094	106	020	145	008
		STD	0125	0424	3483	2765	0004643	0077	14697	709					
		STD	0150	0413	3485	2767	0004441	0089	14697	700					
006		OBS	0154	0411	3485	2768			14697	699	104	118	036	152	006
		STD	0200	0387	3487	2772	0004071	0110	14694	697					
006		OBS	0205	0385	3487	2772			14694	697	092	117	006	112	006
		STD	0250	0376	3488	2774	0003923	0130	14698	698					
		STD	0300	0367	3489	2775	0003809	0149	14703	700					
006		OBS	T0308	0366	3489	2776			14704	700	107	117	004	147	009
		STD	0400	0352	3488	2776	0003792	0187	14713	701					
024		OBS	T0405	0351	3488	2776			14713	701	104	112	003	147	008
		STD	0500	0348	3488	2776	0003847	0226	14728	703					
024		OBS	0507	0348	3488	2777			14729	703	084	098	002	082	005
		STD	0600	0343	3487	2776	0003946	0264	14742	701					
024		OBS	0608	0343	3487	2776			14743	701	099	105	002	140	008
		STD	0700	0341	3488	2777	0003974	0304	14758	701					
		STD	0800	0339	3488	2777	0004003	0344	14774	701					
024		OBS	0812	0339	3488	2777			14776	701	094	106	004	106	006
		STD	0900	0337	3488	2777	0004083	0384	14790	716					
		STD	1000	0335	3487	2777	0004176	0426	14805	733					
024		OBS	T1015	0335	3487	2777			14808	735	096	[illegible]	002	126	008
		STD	1100	0334	3487	2777	0004219	0466	14822	716					
		STD	1200	0333	3488	2778	0004247	0510	14838	700					
024		OBS	1218	0333	3488	2778			14841	698	105	125	002	173	010
		STD	1300	0334	3488	2778	0004345	0553	14855	698					
		STD	1400	0335	3487	2777	0004455	0597	14872	697					
		STD	1500	0336	3487	2777	0004565	0642	14890	696					
024		OBS	1523	0336	3487	2777			14893	696	097	111	003	121	008
		STD	1750	0338	3490	2779	0004588	0756	14933	673					
		STD	2000	0340	3493	2781	0004590	0871	14977	656					
024		OBS	T2030	0340	3493	2781			14982	655	089	099	001	102	007
		STD	2500	0303	3493	2784	0004429	1097	15047	653					
012		OBS	T2507	0302	3489Q	2782Q				653					
		STD	3000	0253	3492	2788	0004027	1308	15112	667					
012		OBS	T3005	0252	3492	2789			15112	667	097	112	005	136	011
012		OBS	3100	0239	3492	2790			15123	663	092	111	002	093	010

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	58085N	04710 W		185	87	07	20	073	1963		8744	3292	31	00			0	X1		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
			F00		070				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10^7	ΣΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0679	3469	2722	0008541	0000	14778						
077		OBS	0000	0679	3469	2722			14778		050	067	007	051	002
		STD	0010	0680	3470	2723	0008495	0009	14780	721					
077		OBS	0010	0680	3470	2723			14780	721	055	073	010	065	003
		STD	0020	0678	3470	2723	0008485	0017	14781	728					
077		OBS	0025	0666	3470	2725			14777	732	056	074	008	059	002
		STD	0030	0616	3473	2734	0007512	0025	14759	731					
		STD	0050	0479	3484	2759	0005134	0038	14708	726					
077		OBS	0051	0475	3484	2760			14706	726	068	088	014	076	003
		STD	0075	0450	3486	2764	0004670	0050	14700	730					
077		OBS	0076	0449	3486	2764			14700	730	086	106	014	080	004
		STD	0100	0473	3492	2766	0004527	0061	14714	708					
077		OBS	0102	0474	3492	2766			14715	706	074	093	015	099	004
		STD	0125	0470	3494	2768	0004354	0073	14718	694					
		STD	0150	0466	3496	2770	0004188	0083	14720	684					
077		OBS	0152	0466	3496	2770			14721	683	083	101	005	099	005
		STD	0200	0456	3495	2771	0004183	0104	14724	676					
077		OBS	0204	0455	3495	2771			14725	675	076	084	003	103	005
		STD	0250	0439	3494	2772	0004156	0125	14725	684					
		STD	0300	0423	3492	2772	0004145	0146	14727	690					
077		OBS	T0306	0421	3492	2772			14727	691	084	100	004	094	005
		STD	0400	0397	3491	2774	0004037	0187	14732	691					
097		OBS	T0420	0393	3491	2774			14734	690	104	133	004	166	009
		STD	0500	0384	3492	2776	0003946	0227	14743	678					
097		OBS	0523	0381	3492	2776			14746	677	103	131	005	166	009
		STD	0600	0370	3491	2777	0003928	0266	14754	681					
097		OBS	0624	0367	3491	2777			14757	682	096	120	005	129	007
		STD	0700	0363	3491	2777	0003953	0305	14768	683					
		STD	0800	0357	3491	2778	0003971	0345	14782	684					
097		OBS	0824	0356	3491	2778			14785	684	107	131	006	172	010
		STD	0900	0352	3491	2778	0004028	0385	14796	684					
		STD	1000	0348	3490	2778	0004100	0426	14811	684					
097		OBS	T1021	0347	3490	2778			14814	684	091	113	006	125	006
		STD	1100	0346	3490	2778	0004167	0467	14827	683					
		STD	1200	0345	3490	2778	0004236	0509	14843	680					
097		OBS	1225	0345	3490	2778			14848	679	093	113	005	107	006
		STD	1300	0347	3491	2779	0004300	0552	14861	673					
		STD	1400	0350	3491	2779	0004367	0595	14879	667					
		STD	1500	0352	3492	2779	0004428	0639	14897	661					
097		OBS	1532	0353	3492	2779			14903	660	092	106	005	097	
		STD	1750	0344	3493	2781	0004407	0749	14936	658					
		STD	2000	0329	3495	2784	0004283	0858	14972	656					
097		OBS	T2042	0326	3495	2784			14978	656	088	104	004	123	
		STD	2500	0287	3494	2787	0004086	1067	15040	660					
084		OBS	T2530	0283	3494	2787			15044	661	086	099	003	094	007
		STD	3000	0196	3492	2793	0003189	1249	15087	673					
084		OBS	T3011	0194	3492	2793			15088	674	080	104	004	097	006
084		OBS	T3131	0169	3492	2795			15098	693	078	096	003	095	005

SHIP CODE	LATITUDE ° ´1/10	LONGITUDE ° ´1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	58375N	04604 W		185	86	07	20	142	1963		8745	2615	25	34			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		32	F01		080				

MESSENGER TIME HR. 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10[7]	ΣΔD DYN M X 10[3]	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0713	3468	2717	0009062	0000	14791						
144		OBS	0000	0713	3468	2717			14791		058		013	065	004
		STD	0010	0681	3470	2723	0008508	0009	14781	721					
144		OBS	0010	0681	3470	2723			14781	721	068	089	016	078	005
		STD	0020	0679	3471	2724	0008446	0017	14782	720					
144		OBS	0025	0669	3471	2725			14779	720	055	071	012	064	003
		STD	0030	0630	3473	2732	0007641	0025	14764	721					
		STD	0050	0520	3483	2753	0005667	0039	14724	723					
144		OBS	0051	0517	3483	2754			14723	723	069	080	012	062	003
		STD	0075	0494	3492	2764	0004723	0052	14719	700					
144		OBS	0076	0493	3492	2764			14719	699	089	104	023	106	005
		STD	0100	0510	3497	2766	0004507	0063	14730	697					
144		OBS	0103	0511	3498	2767			14731	696	076	100	008	082	004
		STD	0125	0505	3498	2767	0004428	0074	14733	685					
		STD	0150	0497	3498	2768	0004368	0085	14733	678					
144		OBS	0153	0496	3498	2769			14733	677	095	095	004	125	006
		STD	0200	0477	3496	2769	0004335	0107	14733	679					
144		OBS	0204	0475	3496	2769			14733	679	088	111	006	114	006
		STD	0250	0459	3496	2771	0004235	0128	14734	684					
		STD	0300	0443	3495	2772	0004148	0149	14735	688					
144		OBS	T0307	0441	3495	2772			14736	689	090	096	004	118	006
156		OBS	T0398	0416	3492	2773			14740	670	103	114	007	176	009
		STD	0400	0415	3492	2773	0004174	0191	14740	670					
156		OBS	0498	0383	3492	2776			14743	677	096	101	006	128	008
		STD	0500	0383	3492	2776	0003920	0232	14743	677					
156		OBS	0596	0366	3490	2776			14751	685	102	114	006	130	007
		STD	0600	0366	3490	2776	0003974	0271	14752	685					
		STD	0700	0355	3488	2776	0004088	0311	14764	691					
156		OBS	0794	0348	3487	2776			14776	696	107	111	006	169	009
		STD	0800	0348	3487	2776	0004167	0353	14777	696					
		STD	0900	0342	3487	2776	0004181	0394	14791	692					
156		OBS	T0992	0339	3487	2777			14806	690	103	115	006	140	008
		STD	1000	0339	3487	2777	0004226	0436	14807	690					
		STD	1100	0337	3488	2777	0004244	0479	14823	691					
156		OBS	1191	0336	3488	2778			14838	691	109	124	003	171	010
		STD	1200	0336	3488	2778	0004260	0521	14839	690					
		STD	1300	0338	3490	2779	0004214	0564	14857	683					
		STD	1400	0340	3492	2781	0004169	0606	14875	678					
156		OBS	1492	0342	3494	2782			14892	674	114	134	002	166	012
		STD	1500	0342	3494	2782	0004137	0647	14893	674					
		STD	1750	0324	3494	2784	0004094	0750	14928	676					
156		OBS	T1999	0297	3494	2786			14959	677	108	122	001	158	012
		STD	2000	0297	3494	2786	0003913	0850	14959	677					
148		OBS	T2484	0219	3491	2791			15008	684	094	116	002	146	011

SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	58585N	04521 W		185	85	07	20	187	1963		8746	2469	23	27			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		27	F02		069				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY—X10⁷	ΣΔD DYN. M X 10³	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0683	3482	2732	0007624	0000	14782						
191		OBS	0000	0683	3482	2732			14782		069	094	015	093	003
		STD	0010	0648	3482	2737	0007189	0007	14769	716					
191		OBS	0010	0648	3482	2737			14769	716	069	101	013	074	003
		STD	0020	0623	3481	2739	0006965	0014	14761	718					
191		OBS	0025	0613	3480	2740			14758	719	064	076	014	068	002
		STD	0030	0610	3480	2740	0006908	0021	14757	718					
		STD	0050	0594	3479	2742	0006800	0035	14754	714					
191		OBS	0051	0593	3479	2742			14754	714	067	086	017	085	003
		STD	0075	0564	3486	2751	0005972	0051	14747	698					
191		OBS	0076	0562	3486	2751			14746	697	063	073	012	060	003
		STD	0100	0517	3490	2759	0005156	0065	14732	685					
191		OBS	0102	0514	3490	2760			14731	684	079	088	016	080	004
		STD	0125	0509	3491	2761	0005029	0078	14733	682					
		STD	0150	0503	3491	2762	0004954	0090	14735	679					
191		OBS	0152	0502	3491	2762			14735	679	080	094	003	060	004
		STD	0200	0491	3493	2765	0004745	0114	14739	678					
191		OBS	0202	0491	3493	2765			14739	678	087	100	003	074	004
		STD	0250	0484	3493	2766	0004743	0138	14744	678					
		STD	0300	0476	3492	2766	0004748	0162	14748	678					
191		OBS	T0304	0475	3492	2766			14749	678	089	106	008	037	005
204		OBS	T0384	0469	3494	2768			14760	668	097	094	006	124	006
		STD	0400	0465	3494	2769	0004589	0209	14761	668					
204		OBS	0480	0449	3493	2770			14767	667	091	101	006	099	005
		STD	0500	0446	3493	2770	0004538	0254	14769	666					
204		OBS	0573	0433	3494	2772			14776	663	087	094	008	094	005
		STD	0600	0428	3494	2773	0004374	0299	14779	664					
		STD	0700	0411	3493	2774	0004350	0342	14788	669					
204		OBS	0760	0400	3492	2774			14793	672	096	110	006	131	007
		STD	0800	0390	3492	2775	0004304	0386	14796	676					
		STD	0900	0371	3491	2776	0004254	0428	14804	683					
204		OBS	T0945	0365	3490	2776			14809	684	105	111	006	165	009
		STD	1000	0361	3489	2776	0004304	0471	14817	682					
		STD	1100	0355	3488	2776	0004390	0515	14831	679					
204		OBS	1135	0353	3488	2776			14836	678	095	104	006	132	007
		STD	1200	0353	3489	2776	0004440	0559	14847	677					
		STD	1300	0353	3489	2777	0004469	0603	14863	675					
		STD	1400	0351	3490	2778	0004472	0648	14879	673					
204		OBS	1421	0350	3490	2778			14883	672	084		006	086	005
		STD	1500	0348	3491	2779	0004433	0693	14895	672					
		STD	1750	0334	3493	2782	0004298	0802	14932	670					
204		OBS	T1900	0321	3494	2784			14952	668	096	098	005	092	006
		STD	2000	0311	3494	2785	0004099	0907	14965	667					
197		OBS	T2270	0275	3494	2788			14996	662	086	087	006	094	007

SHIP CODE	LATITUDE ° ′1/10	LONGITUDE ° ′1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR S CRUISE NUMBER	STATION NUMBER	DEPTH TO BOTTOM	MAX DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	59115N	04445 W		185	94	07	20	227	1963		8747	2122	20	27			1	X1		

WATER COLOR CODE	TRANS (m)	WIND DIR	SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	WET BULB	VIS CODE	ADD L OBS	SPECIAL OBSERVATIONS
		27	F02		065				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X 10⁷	ΣΔD DYN M X 10³	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0712	3479	2726	0008229	0000	14793						
238		OBS	0000	0712	3479	2726			14793		063	066	015	062	002
		STD	0010	0707	3479	2726	0008179	0008	14792	707					
238		OBS	0010	0707	3479	2726			14792	707	066	080	018	074	003
		STD	0020	0694	3479	2728	0008023	0016	14789	707					
238		OBS	0025	0689	3479	2729			14788	707	070	101	019	082	003
		STD	0030	0685	3479	2730	0007909	0024	14787	706					
		STD	0050	0670	3480	2732	0007679	0040	14784	701					
238		OBS	0051	0669	3480	2732			14784	701	066	086	017	076	003
		STD	0075	0564	3499	2761	0004978	0056	14749	684					
238		OBS	0075	0564	3499	2761			14749	684	072	078	014	071	003
		STD	0100	0553	3501	2764	0004744	0068	14749	668					
238		OBS	0101	0553	3501	2764			14749	667	098	111	012	137	007
		STD	0125	0541	3501	2765	0004654	0080	14747	668					
		STD	0150	0528	3500	2766	0004570	0091	14746	669					
238		OBS	0151	0527	3500	2766			14746	669	090	111	004	091	004
		STD	0200	0506	3500	2769	0004382	0113	14746	663					
238		OBS	0202	0505	3500	2769			14746	663	075	089	004	054	004
		STD	0250	0494	3499	2770	0004371	0135	14749	663					
		STD	0300	0481	3498	2770	0004355	0157	14752	662					
238		OBS	T0303	0480	3498	2770			14752	662	090	100	002	065	005
		STD	0400	0453	3496	2772	0004295	0200	14756	664					
231		OBS	T0403	0452	3496	2772			14756	664	088	100	002	071	005
		STD	0500	0433	3495	2773	0004254	0243	14764	667					
231		OBS	0504	0432	3495	2773			14765	667	086	103	004	072	006
		STD	0600	0413	3493	2774	0004268	0286	14772	661					
231		OBS	0605	0412	3493	2774			14773	661	096	106	002	089	006
		STD	0700	0398	3494	2776	0004163	0328	14783	667					
		STD	0800	0386	3494	2777	0004080	0369	14794	674					
231		OBS	0807	0385	3494	2778			14795	674	086	102	001	072	005
		STD	0900	0377	3493	2778	0004132	0410	14807	669					
		STD	1000	0370	3492	2778	0004211	0452	14821	663					
231		OBS	T1010	0369	3492	2778			14822	662	096	103	003	092	007
		STD	1100	0364	3492	2778	0004202	0494	14835	660					
		STD	1200	0358	3493	2779	0004176	0536	14849	657					
231		OBS	1213	0357	3493	2780			14851	657	083	094	002	066	005
		STD	1300	0353	3494	2780	0004153	0578	14864	657					
		STD	1400	0346	3494	2782	0004102	0619	14878	657					
		STD	1500	0336	3495	2783	0004010	0659	14891	656					
231		OBS	T1548	0331	3495	2784			14897	656	108	129	003	159	011
		STD	1750	0302	3495	2786	0003738	0756	14919	660					
231		OBS	T1994	0255	3494	2790			14940	668	084	091	003	081	

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT.
EV	59205N	04435 W		185	94	07	21	013	1963		8748	1189	11	32			1	X1		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR.	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		32	F03		058				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	ΣΔD DYN M. X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0726	3483	2727	0008119	0000	14798						
028		OBS	0000	0726	3483	2727			14798		050	072	012	034	002
		STD	0010	0724	3484	2728	0008035	0008	14799	707					
028		OBS	0010	0724	3484	2728			14799	707	049	071	011	039	002
		STD	0020	0698	3492	2738	0007108	0016	14792	695					
028		OBS	0025	0686	3495	2742			14789	690	064	087	012	052	003
		STD	0030	0672	3497	2745	0006417	0022	14784	685					
		STD	0050	0629	3505	2757	0005323	0034	14771	669					
028		OBS	0051	0628	3505	2758			14771	668	091	108	022	131	006
		STD	0075	0612	3505	2760	0005113	0047	14769	662					
028		OBS	0076	0611	3505	2760			14768	662	076	091	008	064	004
		STD	0100	0606	3505	2761	0005078	0060	14770	661					
028		OBS	0103	0605	3505	2761			14770	661	070	085	002	049	004
		STD	0125	0602	3505	2761	0005065	0073	14773	661					
		STD	0150	0595	3505	2762	0005013	0085	14774	661					
028		OBS	0153	0594	3505	2762			14774	661	078	081	002	055	005
		STD	0200	0569	3504	2765	0004828	0110	14772	661					
028		OBS	0204	0567	3504	2765			14772	661	075	082	002	054	004
		STD	0250	0565	3503	2764	0004922	0134	14778	661					
		STD	0300	0545	3502	2766	0004817	0159	14778	660					
028		OBS	T0307	0541	3502	2766			14778	660	090	101	006	098	005
		STD	0400	0452	3496	2772	0004291	0204	14756	672					
022		OBS	T0400	0452	3496	2772			14756	672					
		STD	0500	0435	3493	2771	0004426	0248	14765	677					
022		OBS	0500	0435	3493	2771			14765	677	098	104	017	079	005
022		OBS	0599	0423	3494	2774			14776	691	094	097	005	106	006
		STD	0600	0423	3494	2774	0004316	0291	14777	691					
		STD	0700	0409	3494	2775	0004290	0334	14787	676					
022		OBS	0798	0400	3493	2775			14800	672	087	092	006	098	006
		STD	0800	0400	3493	2775	0004317	0377	14800	673					
		STD	0900	0394	3494	2776	0004302	0421	14814	695					
022		OBS	T0998	0392	3494	2777			14830	696	083	092	005	085	005
		STD	1000	0392	3494	2777	0004333	0464	14830	696					
022		OBS	T1067	0393	3494	2777			14842	684	079	094	005	093	005

SHIP CODE	LATITUDE ° ′ 1/10	LONGITUDE ° ′ 1/10	DRIFT INDICATOR	MARSDEN SQUARE 10°	MARSDEN SQUARE 1°	STATION TIME (GMT) MONTH	DAY	HR 1/10	YEAR	ORIGINATOR'S CRUISE NUMBER	ORIGINATOR'S STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES	WAVE OBSERVATIONS DIR	HGT	PER	SEA AMT	WEATHER CODE	CLOUD CODES TYPE	AMT
EV	5927 N	04404 W		185	94	07	21	050	1963		8749	0214	02	27			1	X2		

WATER COLOR CODE	WATER TRANS (m)	WIND DIR	WIND SPEED OR FORCE	BAROMETER	AIR TEMP °C DRY BULB	AIR TEMP °C WET BULB	VIS CODE	ADD'L OBS	SPECIAL OBSERVATIONS
		27	F04		041				

MESSENGER TIME HR 1/10	CAST NO	CARD TYPE	DEPTH (M)	T °C	S ‰	SIGMA—T	SPECIFIC VOLUME ANOMALY — X10^7	ΣΔD DYN M X 10^3	SOUND VELOCITY	O_2 ml/l	PO_4—P µg-at/l	TOTAL—P µg-at/l	NO_2—N µg-at/l	NO_3—N µg-at/l	SiO_4—Si µg-at/l
		STD	0000	0295	3336	2660	0014422	0000	14602						
053		OBS	0000	0295	3336	2660			14602		023	055	012	014	001
		STD	0010	0305	3340	2663	0014209	0014	14608	828					
053		OBS	0010	0305	3340	2663			14608	828	024	064	013	017	001
		STD	0020	0450	3423	2714	0009333	0026	14682	757					
053		OBS	0024	0489	3446	2728			14702	736	057	080	013	052	002
		STD	0030	0483	3452	2734	0007517	0035	14702	728					
053		OBS	0049	0481	3469	2747			14706	704	064	077	012	048	002
		STD	0050	0483	3470	2748	0006190	0048	14707	703					
053		OBS	0072	0512	3489	2760			14726	678	078	094	023	087	004
		STD	0075	0512	3489	2760	0005114	0062	14726	678					
053		OBS	0097	0513	3490	2760			14730		071	072	010	072	003
		STD	0100	0512	3490	2760	0005083	0075	14730	678					
		STD	0125	0503	3489	2760	0005094	0088	14731	677					
053		OBS	T0145	0499	3488	2760			14732	677	073	088	016	084	004
		STD	0150	0499	3488	2760	0005132	0101	14733	677					
053		OBS	T0182	0500	3489	2761			14739	677	076	095	015	070	004

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BULLETIN No. 50

REPORT OF THE INTERNATIONAL ICE PATROL SERVICE IN THE NORTH ATLANTIC OCEAN - [SEASON of 1964]

U.S. TREASURY DEPARTMENT
COAST GUARD

Bulletin No. 50

REPORT OF THE INTERNATIONAL ICE PATROL SERVICE

IN THE

NORTH ATLANTIC OCEAN

R. E. LENCZYK

CG-188-19

Season of 1964

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1965

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Transmitted herewith is Bulletin No. 50, Report of the International Ice Patrol Service in the North Atlantic Ocean, season of 1964.

W.D. Shields

W. D. SHIELDS,
Vice Admiral, U.S. Coast Guard,
Acting Commandant.

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PREFACE

This bulletin is the annual report of the International Ice Patrol Service for 1964. The operations of the International Ice Patrol for 1964 including aircraft and comunications activities are described. Monthly ice conditions and statistics on ice and weather reports from shipping for 1964 are reported. Preseason and post season activities including the 1964 preseason northern ice surveys and the 1964 post season ice surveys are described. There is a special section on weather including a discussion of the correlation of meteorological elements and the severity of the Grand Banks iceberg season. A discussion of the future of the International Ice Patrol is also included.

Comdr. Glenn O. Thompson, USCG was Commander, International Ice Patrol, during the 1964 preseason period and during the season until relieved by Comdr. William E. Murphy, USCG on 24 May 1964. Capt. Richard L. Fuller, USCG became Commander, International Ice Patrol, on 23 July 1964 and performed these duties during the remainder of the 1964 ice season and during the post season period.

The author of this bulletin is Comdr. R. E. Lenczyk, USCG. The author gratefully acknowledges meterological data supplied by Mr. William E. Markham, head of the Canadian Department of Transport Ice Central, Halifax, Nova Scotia, and by the U.S. Naval Oceanographic Office.

With the publication of this report, this bulletin will be revised in format. In the past, distribution of the annual report has been significantly delayed because of the time required to process and analyze the oceanographic data. The report of the operational phase of the International Ice Patrol Service, including the narrative report of activities and ice conditions and descriptions of research into the operational problems, will continue to be published in this series. The sections describing the physical oceanography of the Grand Banks region and the Labrador Sea and oceanographic research will be published separately in a recently established series: U.S. Coast Guard Oceanographic Reports, CG–373.

INTERNATIONAL ICE PATROL 1964

In accordance with the terms of the International Convention on Safety of life at Sea, London, 1948, the International Ice Patrol was conducted in 1964 by the U.S. Coast Guard and was the 45th such patrol since 1913. After four successive light iceberg years, 1964 saw a return to normal as an estimated 369 bergs drifted south of 48° N. compared to the annual average of 382 since 1900. See table 1 for iceberg statistics compiled from International Ice Patrol records.

The Ice Patrol operated during the period 2 March to 29 July in the vicinity of the Grand Banks Newfoundland from its base at the U.S. Naval Station, Argentia, Newfoundland. Comdr. Glenn O. Thompson, USCG was assigned as Commander. International Ice Patrol. Operating forces assigned to the Commander included the U.S. Coast Guard Air Station, Argentia, Newfoundland; U.S. Coast Guard Radio Station NIK, Argentia; U.S. Coast Guard Cutter *Evergreen*, oceanographic vessel; and the U.S. Coast Guard Cutters *Acushnet* and *Cherokee*, standby patrol vessels.

For the first time, the International Ice Patrol was operated by a nucleus unit permanently stationed at Argentia. Commander, International Ice Patrol was also commanding officer of the U.S. Coast Guard Air Station, Argentia and U.S. Coast Guard Radio Station NIK. For the first time the Commander, International Ice Patrol, had operational and administrative control of all assigned aircraft and personnel, the ice operations office, and the radio station, making for a more cohesive and effective organization than was possible before. The new organization has permitted a more efficient Ice Patrol during the ice season and also more efficient study and observation of ice conditions during the rest of the year.

For the second consecutive year northern ice observation flights were conducted primarily to determine the Grand Banks iceberg potential for the coming ice season. An early iceberg survey was conducted 3–5 December 1963 along the Labrador and Baffin Island coasts to Cape Dyer, and a second survey was conducted 27–28 February from Newfoundland to Cape Chidley, the northern tip of Labrador. Both surveys indicated a greater supply than was available for the 1963 ice season. It is planned to increase the scope of northern ice observation to include a systematic study of the iceberg problem from the source in Baffin Bay to termination at the Grand Banks. As data are annually accumulated, analyzed, and correlated with meteorolog-

ical and oceanographic factors, iceberg forecasting should be considerably improved and the Ice Patrol operated more efficiently for the benefit of shipping. For details of the northern ice surveys preceding the 1964 ice season see another section of this bulletin.

The operations of the Ice Patrol from 2 March to 29 July are summarized as follows:

1. Ice Patrol aircraft conducted 42 ice reconnaissance flights for the main purpose of guarding the limits of ice in the vicinity of the Grand Banks and to determine the ice conditions there.

2. Ice reports were collected from ships, aircraft, and other ice observation agencies.

3. Pertinent ice information was plotted and analyzed.

4. Ice conditions in the vicinity of the Grand Banks were forecast twice daily during the periods between observed ice conditions.

5. Ice advisory bulletins were broadcast twice daily to shipping and were telegraphed twice daily to other interested agencies.

6. Special ice information was provided to ships on request.

7. Weather reports including sea temperatures were collected by radio from ships traversing the area and were used to assist the forecasting of ice conditions.

8. Position plots were maintained of all reporting ships in the Ice Patrol area.

9. Five oceanographic surveys were conducted between 15 March and 19 June for the purpose of collecting oceanographic information affecting the drift and deterioration of ice.

10. A special iceberg drift and deterioration research project was conducted by the oceanographic vessel from 14–22 May.

For the fifth successive season and the 13th of the last 15 seasons the Ice Patrol vessels were not required. While no ice drifted into or near Track B or Track C when it was in effect, a major potential threat to Track B existed in late April. The ready availability of the oceanographic vessel *Evergreen* for duty as the surface patrol vessel precluded the necessity of having to call the *Acushnet*.

As in previous years, *Evergreen*, with a Coast Guard Oceanographic Unit Team aboard, conducted oceanographic surveys on the Grand Banks and vicinity in support of the Ice Patrol. Three variations from usual oceanographic operations are noted: (1) *Evergreen* commenced the first survey in mid-March, two weeks earlier than usual to more closely coincide with the development of the berg threat; (2) In lieu of systematic preplanned surveys, individual surveys were conducted in critical areas based on existing and forecast ice conditions; and (3) An iceberg drift-deterioration project was conducted during a period when an oceanographic survey was not considered an operational requirement. These changes were possible mainly as a result of the development of normal current charts based on many past oceanographic surveys. A temperature recorder was moored in the

core of the Labrador Current for three 2-week periods in April, May, and June. For the first time a computer was used aboard the *Evergreen* to make computations previously made by hand thus speeding up the process of construction of the dynamic topographic current charts. Isotherm charts based on the average centigrade temperatures from the sea surface to 150 meters were constructed for each oceanographic survey. These charts permitted more accurate forecasting of ice conditions than was previously possible. See Figures 11–15. For a detailed discussion of oceanographic operations see U.S. Coast Guard Oceanographic Report CG–373–10.

Although the coastal regions of eastern Newfoundland and the northern Grand Banks contained many bergs from early March through June, the Tail of the Banks had a relatively light ice year with no bergs drifting south of 43° N. An estimated total of five bergs crossed south of 44° N., all within a 4-week period from early May to early June. Most important is the fact that the major United States-European shipping Tracks B and C, when in use, remained ice free, although a threat of major proportions existed in April and a minor threat existed during May and June. These threats did not materialize due to the prevailing winds. The sea ice on the Grand Banks was slightly heavier and more extensive than normal.

The preseason northern iceberg survey on 27–28 February indicated that the Grand Banks potential was about 10 times the potential of 1963, a very light berg year. Climatological conditions upstream in the Labrador Current along the Labrador and Baffin Island east coasts were generally very favorable for ice drift south and for ice survival during December, January and February. As a result many bergs had drifted to a position about 200 miles north of the Grand Banks by 1 March. Three early bergs had already drifted onto the Grand Banks. There were an estimated 130 bergs south of Belle Isle, 360 from 52° N.–56° N., and 410 from 56° N. to Cape Chidley, Labrador, for a total of about 900 bergs south of Cape Chidley.

The very favorable weather conditions for ice survival and drift south persisted into March and April along northern Newfoundland and Labrador (average strong cold northwesterly air flow) with the result that considerable ice was rapidly transported toward and onto the Grand Banks during this period. The prevailing winds drove the first wave of bergs out of the main branch of the Labrador Current toward and close along the east coast of Newfoundland with many permanently removed as a threat to the major shipping lanes. While the threat to shipping had been greatly relieved, an estimated 88 bergs drifted south of 48° N. during March creating the third heaviest March berg month on record (using 48° N. as a yardstick).

April was characterized by two distinct weather patterns with winds averaging strong west by south over the northern Grand Banks for

the first half of April and strong northerly over the northern and western Grand Banks the remainder of April. Consequently many bergs located along the coast in early April were driven out to sea into the Labrador Current and drifted at average rates of 25 to 35 miles per day from the combined force of wind and current. By mid-April there were an estimated 300 bergs spread out from the coast to 300 miles eastward, mostly between 48° N. and 49° N. Some bergs were being driven east out of the Labrador Current to the area north of Flemish Cap. Due to an abrupt change in the weather pattern producing strong northerly winds, bergs were driven south about 130 miles in 11 days with the northern half of the Banks infested with bergs. By the end of April there were an estimated 275 bergs south of 48° N. only 20 of which remained in the main branch of the Labrador Current on the east slope of the Grand Banks. An estimated 225 bergs drifted south of 48° N. during April for a total of 316 for the year thus far. This was the greatest recorded number of bergs south of 48° N. during March and April since 1945.

Of major concern now were the 20 bergs in the Current only 200 miles from the Tail of the Banks. However, late April west-northwesterly winds in this area drove all 20 bergs to the southeast and out of the Current removing them permanently as a threat to Track B. These bergs deteriorated in 12 days as they entered warmer waters with a couple drifting east to 45°30′ W. before perishing. Only a few bergs remained in position west of the Current to reenter and continue drifting toward the Tail of the Banks. From early May to early June a handful of these bergs did reenter the Current and five managed to drift south of 44° N. before deteriorating, but none drifted south of 43° N. The deterioration of the many other bergs farther west on the Grand Banks was comparatively slow due to abnormally cold sea temperatures. While these bergs were not a threat to Track C or B, many were a threat to Tracks E and F which were being used by ships plying Canadian ports and ships enroute to or from the St. Lawrence Seaway.

Much attention was directed to a group of about 200 bergs located close ashore from Cape Bonavista to 51° N. in mid-May. As west-southwesterly winds soon arrived these bergs began to move into the Labrador Current and out to sea along the northern Grand Banks, the leaders reaching the northeast slope by the end of June. As winds averaged southwesterly in June bergs tended to drift east out of the Current and failed to achieve any significant southern drift. By mid-June the deterioration of bergs in this area was exceeding the supply and it was obvious that only a minor threat to Track C existed. One berg managed to reach 45°45′ N., 47°10′ W. and a growler was reported 70 miles further southwest in mid-July. This was the southernmost penetration since early June and for the remainder of the

year. While no threat developed to Track C, Track F was pestered by a few bergs until late July with one berg persisting until early August. After the deterioration of the latter berg, no other bergs were expected to reach the Grand Banks the remainder of the year. While the number of bergs drifting south of 48° N. was very heavy during March and April, the May total of 19 was very light and the June and July totals of 28 and 5 were well below normal.

The appearance of several conspicuous flat-topped tabular bergs similar in height on the northern Grand Banks in early April was of considerable interest. There is no doubt that these tabular bergs were fragments of ice island WH–5 which had grounded across Kennedy Channel early in 1963. Kennedy Channel is a link between the Arctic Ocean and the North Atlantic Ocean located between Ellesmere Island and northwestern Greenland. By the end of July 1963 WH–5 had broken up into three major pieces designated Alpha, Bravo, and Charlie and many small fragments, and all commenced drifting south at this time. Charlie cleared Smith Sound around mid-August to enter the south seeking Baffinland Current in Baffin Bay. There is little doubt that the many fragments arriving at the Grand Banks were pieces of Charlie. Fragments were observed in the vicinity of Hamilton Inlet in July and a couple were spotted in Baffin Bay in October 1964. The travel times of inidvidual pieces originating from the same location varied considerably thus pointing out the vagaries of iceberg drift southward from northern Baffin Bay, the region of many iceberg producing glaciers. The fact that icebergs can drift from the glaciers to the Grand Banks in less than a year with ease has been amply demonstrated.

Sea ice conditions on the Grand Banks were about normal on 1 March with local and Labrador winter ice covering the northern Grand Banks north of 47°20′ N. and west of 48°20′ W. The sea ice limits generally followed the weather patterns. By mid-March the limits had expanded to 46°20′ N. and east to 48° W. By the end of March the east limits receded to west of 51° W. while the southwest limits expanded to 100 miles southeast of Cape Race. As a result of strong southwesterly winds in the first half of April the south sea ice limits receded to north of 48° N. while a 10–20 mile belt of sea ice extended about 170 miles to the southeast from the pack at 49°30′ N., 50° W. By the end of April the east limits receded to west of 50° W. Sea ice persisted along the east coast of Newfoundland from St. John's northward until mid-May and in Notre Dame until the third week of June. Belle Isle Strait was considered navigable by mid-June.

The Gulf of St. Lawrence, including Cabot Strait and the Northeast Arm, experienced a slightly heavier than normal ice year. The steamer track through Cabot Strait and the Central Gulf and into upper St. Lawrence River was not declared navigable until 5 April,

although ships were getting through with icebreaker assistance throughout the winter. Sea ice persisted along Cape Breton until mid-May. Detailed monthly ice conditions appear in a later section.

Table 1. Estimated Number of Icebergs South of 48° N., 1900–64

Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual
1900–1945	118	447	2,101	4,811	7,156	3,486	1,199	397	247	107	106	80	20,255
1946	0	2	67	98	168	88	7	0	0	0	0	0	430
1947	3	1	2	5	11	26	15	0	0	0	0	0	63
1948	0	0	60	210	185	68	0	0	0	0	0	0	523
1949	0	0	1	23	20	3	0	0	0	0	0	0	47
1950	0	12	61	183	135	58	7	0	1	1	2	0	460
1951	0	3	2	0	0	0	0	0	0	0	0	1	6
1952	0	0	0	12	2	0	0	0	0	0	0	0	14
1953	0	0	21	11	18	6	0	0	0	0	0	0	56
1954	1	16	47	165	65	16	2	0	0	0	0	0	312
1955	0	0	10	32	14	5	0	0	0	0	0	0	61
1956	0	0	9	13	34	21	3	0	0	0	0	0	80
1957	3	43	41	172	265	288	113	6	0	0	0	0	931
1958	0	0	0	0	0	0	1	0	0	0	0	0	1
1959	0	0	14	266	180	186	43	0	0	0	2	3	693
1960	3	0	41	161	44	4	0	0	0	0	0	0	253
1961	0	6	60	30	16	1	0	1	0	1	0	1	117
1962	0	0	14	72	21	10	3	0	0	0	0	0	120
1963	0	0	4	20	0	0	1	0	0	0	0	0	25
1964	0	3	88	225	19	28	5	1	0	0	0	0	369
Total 1946–64	10	86	542	1,698	1,197	808	200	8	1	2	4	5	4,561
Average 1946–64	0.5	4.4	28.5	89.4	63.0	42.5	10.5	0.4	0.1	0.1	0.2	0.3	240
Total 1900–64	128	533	2,643	6,509	8,353	4,294	1,399	405	248	109	110	85	24,788
Average 1900–1964	2.0	8.2	40.7	100.1	128.5	66.1	21.5	6.2	3.8	1.7	1.7	1.3	381

NOTES

1. The monthly accumulative totals are tabulated for 1900–45.
2. The totals for 1946–64 are based mainly upon aircraft reconnaissance and are probably more accurate than prior estimtes.
3. For the years 1946–64, 64 percent of the bergs drifted south of 48° N. during April and May, 94 percent during March–June and 99 percent during the 6-month period February–July.
4. The annual average from 1946–64 is about 40 percent less than the 1900–64 average. Whether the 1946–64 average represents a cyclic trend or the estimates made before use of aircraft were over exaggerated is open to speculation.

AERIAL ICE RECONNAISSANCE

The ice limits in the vicinity of the Grand Banks were guarded and ice information was collected by planned aerial ice reconnaissance performed by two Lockheed Hercules (HC–130 B) aircraft of the U.S. Coast Guard Air Station, Argentia. After 2 years experience with this aircraft, it can be stated that the Hercules aircraft has proven to be more reliable and has a greater capability than previous aircraft used. The main advantage of the Hercules is its increased speed allowing more coverage per flight hour. Navigation by the Doppler system with Loran A as a backup was an improvement over the previous year. Forty-two flights totaling 295.8 hours were made during the ice season. An average of two flights weekly were made.

For the first time two Ice Patrol Flights were made the same day by the same aircraft. See table 2 for 1964 aerial ice reconnaissance statistics.

Aircraft were first used by the International Ice Patrol in 1946 to supplement the patrol ships. In 1949 the ice limits were guarded and ice observation conducted solely by aircraft. Since 1949, Ice Patrol vessels have been used only 3 years, the heavy ice years of 1950, 1957, and 1959, and the aircraft has become recognized as the primary tool for guarding the ice limits and for ice observation. Nevertheless there comes a time when aircraft cannot effectively do the job alone, and the patrol by ship must be established. The patrol vessel is required when there is a prolonged iceberg threat to Track B or C near the Tail of the Banks. This area is perhaps the foggiest in the world especially in the spring. Aircraft simply cannot effectively guard the limits under the above circumstances.

Seven observation flights were made from 18 January to 29 February to determine the southern limits of ice, detect its progress and to enable the decision on when to commence the International Ice Patrol. Two of these flights were made in a survey from the Grand Banks of Newfoundland along the coast of Labrador to Hudson Strait entrance for the main purpose of measuring the 1964 iceberg potential. Four postseason flights were made from 29 July to 21 September to detect the movement of stray bergs onto the Grand Banks after the conclusion of the ice season. A total of 10 flights were made from 22 September to the end of the year to determine monthly ice conditions along the Labrador coast, conduct an iceberg census of the western half of Baffin Bay and Davis Strait, and to conduct monthly iceberg surveys in northern areas.

Table 2. Aerial Ice Reconnaissance Statistics—1964 Season

Month	Number of flights	Number days flights made	Number days good visibility [1]	Average visual effectiveness percent	Maximum number days between flights	Hours flown
March (2–31)	6	6	12	81	8	42.9
April	10	9	11	60	4	74.6
May	11	10	12	82	6	77.5
June	9	8	9	74	8	63.2
July (1–29)	6	6	5	53	12	37.6
Total/average	42	39	49	73		295.8

[1] Days on which an estimated 50 percent of flight area can be searched visually with 25-mile track spacing.

COMMUNICATIONS

Effective ice observation is of no use to ships unless the pertinent results therefrom can be rapidly and accurately transmitted to them. For this purpose Commander, International Ice Patrol has Coast

Guard Radio Station NIK/NJN. NIK is in operation only during the ice season during which time the regular radio station force is supplemented by additional radiomen. The ice operations office and radio station are linked by internal teletype. Communications during the past season were considered outstanding. An important factor was the establishment at Argentia of the International Ice Patrol Office staffed with a permanent nucleus of personnel including a radioman. The handling of traffic especially during the start of the season was comparatively most efficient.

Twice-daily ice broadcasts were made to shipping by NIK at 0048 and 1248 Greenwich mean time simultaneously on 155, 5320, 8502 and 12880.5 kc. commencing 2 March and terminating 29 July. For the third successive year ice charts were successfully broadcast by facsimile at 1330 G.M.T. on 5320, 8502 and 12880.5 kc. These broadcasts were made from facsimile transceivers recently installed in the ice operations office. Also twice-daily ice bulletins were transmitted at 0030 and 1230 G.M.T. via teletype to U.S. Naval Oceanographic Office, Washington, D.C., Canadian Department of Transport Ice Forecast Central, Halifax, and others for further dissemination. The frequency of 12880.5 kc. was added to the family of ice broadcast frequencies by radio telegraph and facsimile increasing NIK transmission coverage.

Ice Patrol Radio Station NIK worked merchant ships on 427, 6477.5 8734, and 12718.5 kc. Ship reports of ice and weather in the Grand Banks area were an indispensable source of ice information and oceanographic and meteorological data. There was a marked increase in traffic handled during the 1964 season with a 50 percent increase in monthly radio messages and a 33 percent increase in landline messages as compared to 1963. While most of the increase is attributed to the fact that 1964 was a normal ice year as compared to the very light 1963 ice season, the establishment of the permanent organization at Argentia is believed a factor. The excellent cooperation of shipping is gratefully acknowledged.

During the 1964 season, Ice Patrol communication facilities handled a total of 22,623 radio messages and 33,841 landline messages. Statistics on ship reports are as follows:

Number of ice messages received from vessels	1,498
Number of vessels furnishing ice reports	388
Number of weather reports received from vessels	9,147
Number of vessels furnishing weather reports	625
Number of requests for special ice information	176
Total number of vessels worked (not including relays)	709

The percentage distribution of reporting vessels by nationality is as follows:

Country	Number of reporting ships	Percentage of total	Country	Number of reporting ships	Percentage of total
United Kingdom	162	24.0	Lebanon	5	.7
United States	103	15.3	Panama	5	.7
Germany	88	13.1	India	4	.6
Norway	72	10.7	Switzerland	4	.6
Sweden	42	6.2	Yugoslavia	4	.6
Liberia	35	5.2	Iceland	3	.4
Netherlands	33	4.9	Finland	2	.2
France	21	3.1	Japan	2	.2
Greece	20	3.0	Portugal	2	.2
Italy	17	2.5	Arabia	1	.1
Denmark	12	1.8	Canada	1	.1
Poland	9	1.3	Colombia	1	.1
Ireland	8	1.2	Spain	1	.1
Russia	8	1.2	Uruguay	1	.1
Belgium	6	.9			
Israel	6	.9	30 nations	675	100.0

MONTHLY ICE CONDITIONS 1964

JANUARY

The persistence of pack ice along the east Baffin Island coast throughout the summer and autumn of 1963 was the first omen of a normal or heavy iceberg year for the Grand Banks in 1964. A berg survey made in early December along the Labrador and Baffin Island east coasts north to Cape Dyer somewhat allayed fears of a heavy ice year, as the berg supply was evaluated to be below normal. On the other hand, the weather for Labrador and Newfoundland in December and January was abnormally cold and very favorable for berg transport to the south. At the beginning of January the east coast of Newfoundland was estimated to be ice free with no bergs south of 52° N. The first preseason flight made on the 18th revealed the southernmost berg aground off Cape Freels and two other bergs south of Belle Isle. The sea ice which started to form near Belle Isle in early January now extended south to Bonavista Bay with the eastern limits along 53° W. By the end of the month, the southernmost berg was the same berg aground off Cape Freels. There was only one other berg south of Belle Isle. The sea ice limits had expanded east to 51°30′ W. and south to Cape Bonavista. Sea ice conditions were heavier than normal at this time. Belle Isle Strait was declared closed on 5 January by the Canadian Department of Transport. Sea ice began to form in early January in the northeast arm of the Gulf of St. Lawrence, along the southern coast of Quebec Province, and near Cape Gaspe. By the end of the month, the entire Gulf was covered by ice except for the northern entrance of Cabot Strait and the west coast of Newfoundland south of Bay Islands.

FEBRUARY

During most of the month the sea ice limits remained remarkably static due mainly to above normal air temperatures. Surface winds along the Labrador coast were favorable for the southward transport of icebergs. The first berg arrival on the Grand Banks for the year occurred in mid-February. It was a small berg and it deteriorated within 2 days of crossing 48° N. near the longitude of 48°30′ W. The medium berg aground off Cape Freels since 18 January was finally driven out to sea and grounded near 46°50′ N., 51° W. until deteriorating at the end of the month. At the end of February there were only two bergs south of 50° N. and an estimated 100 bergs between 50° N. and 52° N. A second special preseason northern berg survey was conducted on 26 and 28 February. There were an estimated total of 900 bergs south of Cape Chidley indicating a potential over seven times as great as that of the 13–14 March 1963 survey. Of special interest were the sightings of several flat tabular bergs about 15 feet high and as long as 2,000 feet. These bergs were believed fragments of the ice island blocking Kennedy Channel last spring and early summer. Five ice island fragments were located near 54°30′ N., 55° W., eleven off Hamilton Inlet, four scattered from Hamilton Inlet to Cape Chidley, and eight close together near 61°15′ N., 63°30′ W. Details of the northern ice surveys are in another section of this bulletin. It was now anticipated that the 1964 iceberg season would be slightly below normal. Three bergs are estimated to have drifted south of 48° N. during February. By the end of February the entire Gulf was covered with sea ice including Cabot Strait.

MARCH

At the beginning of March there were an estimated 180 bergs from 50° N. to 54° N. With strong northwesterly winds during the first 2 weeks these bergs move rapidly at an average rate of 12 miles per day toward the northern Grand Banks, the first concentration arriving there on 13 March. This first wave of 180 bergs was now located between the northern Grand Banks and 50° N. within 75 miles of the east coast of Newfoundland. Would these bergs move to the east in the main branch of the Labrador Current to eventually threaten the major shipping lanes or would they drift south along the east coast of Avalon Peninsula and be eliminated as a threat to the main shipping tracks near the Tail of the Banks? This question was quickly answered as a series of intense lows passed to the southeast of Newfoundland producing strong northerly air flow for 10 days driving the numerous bergs to the south-southwest. Many bergs were driven into Bonavista, Trinity, and Conception Bays and temporarily aground along Avalon Peninsula. About 25 bergs were

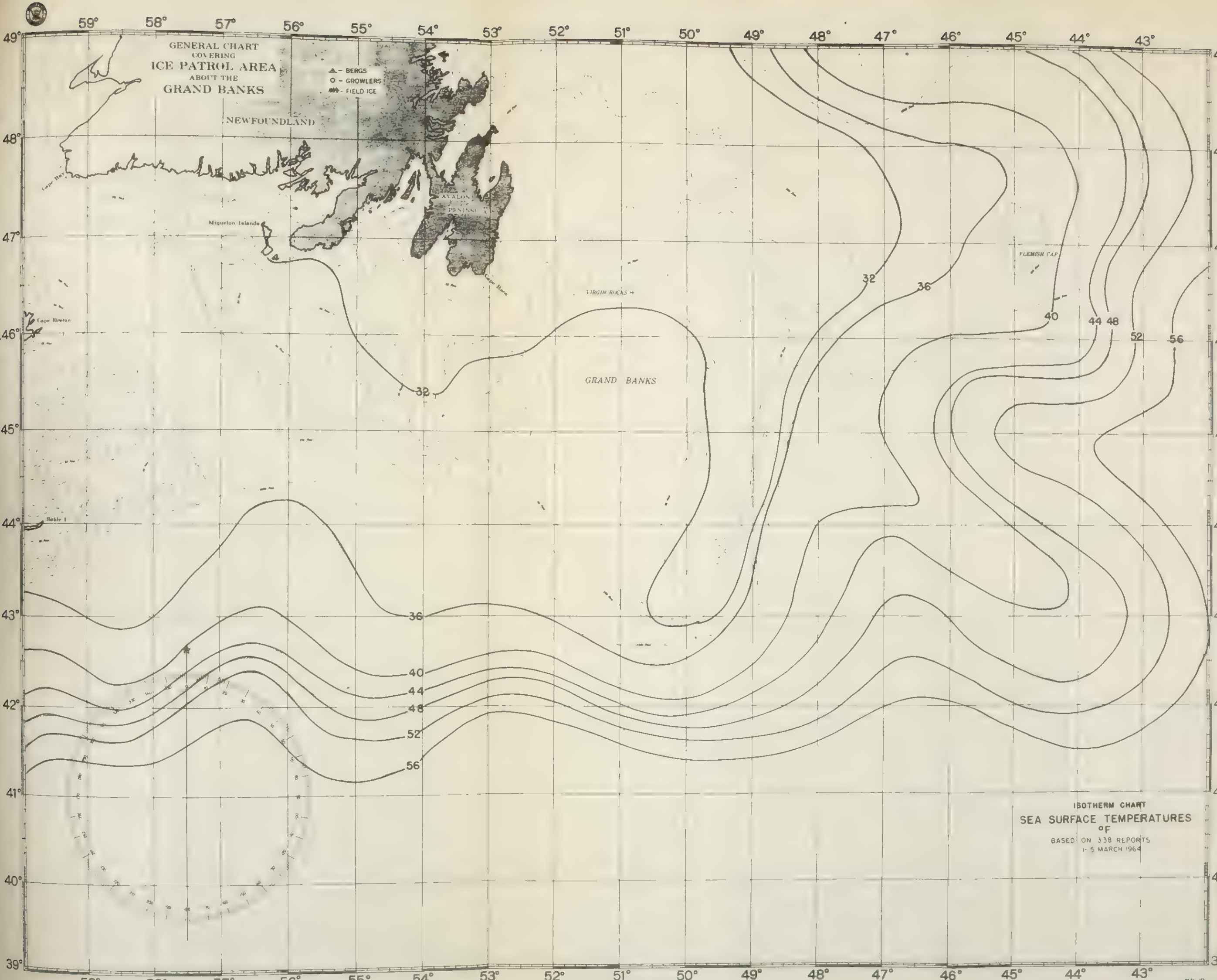

FIGURE 1.—Sea surface isotherms, 1–15 March 1964.

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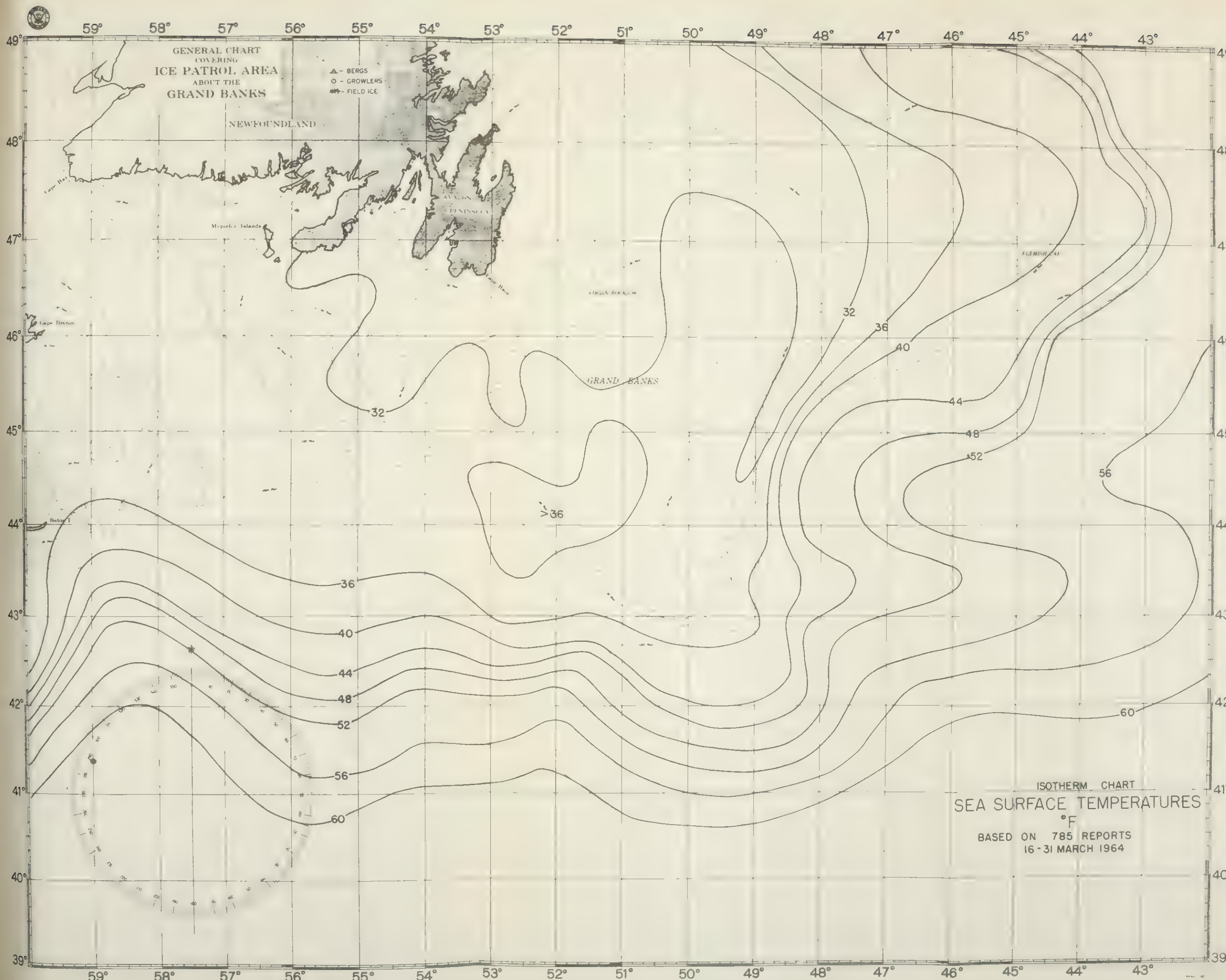

FIGURE 2.—Sea surface isotherms, 16–31 March 1964.

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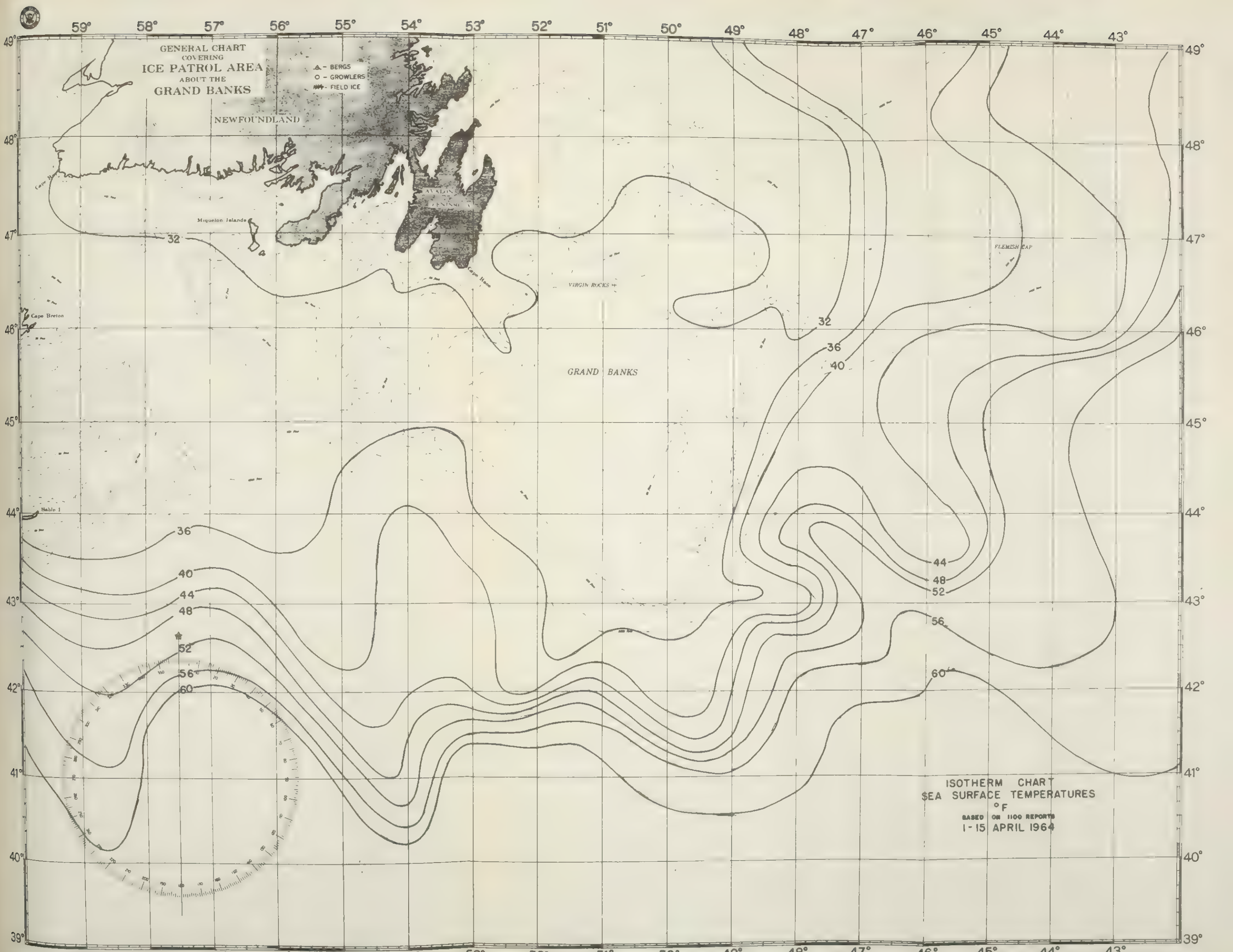

FIGURE 3.—Sea surface isotherms, 1–15 April 1964.

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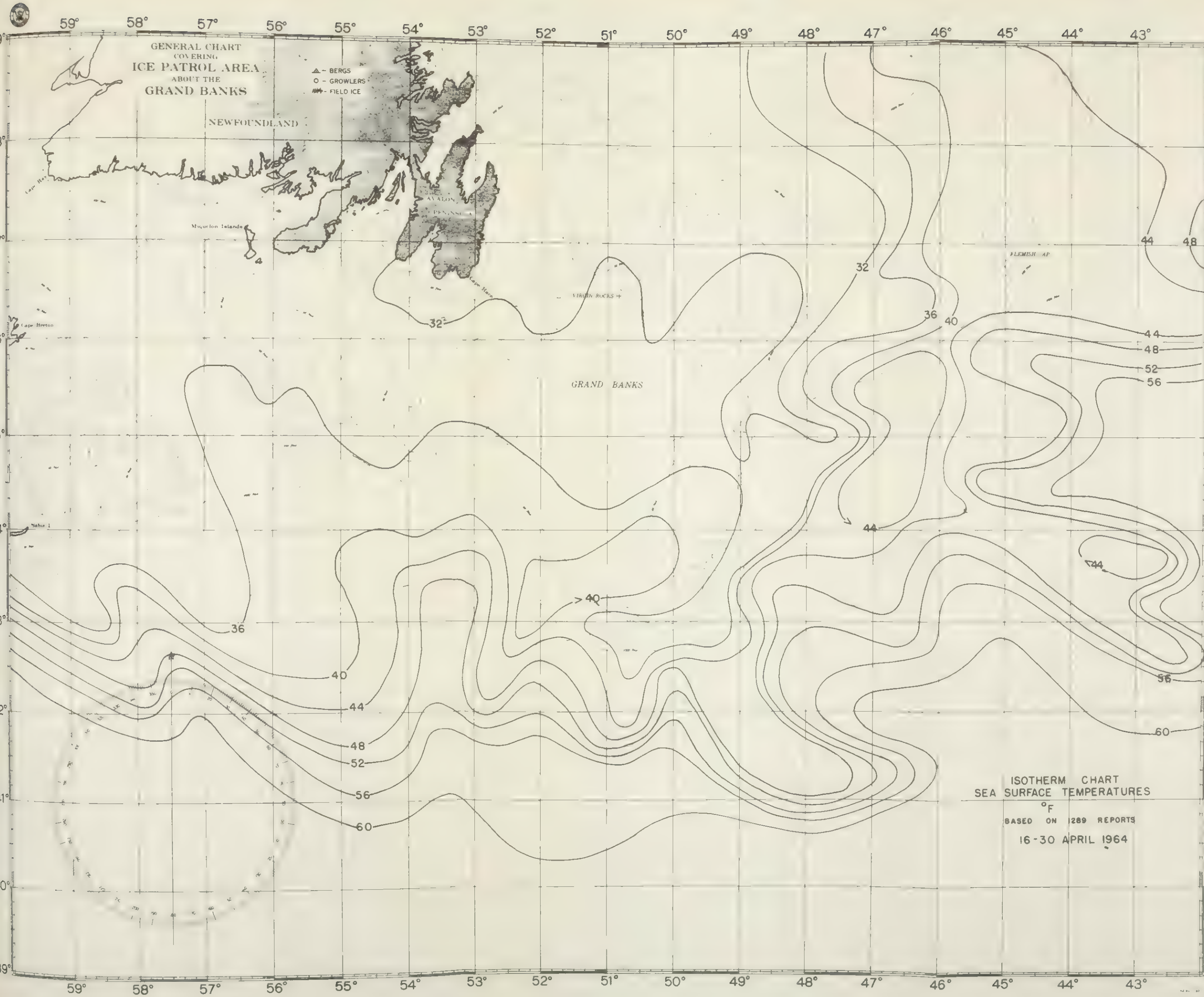

Figure 4.—Sea surface isotherms, 16–30 April 1964.

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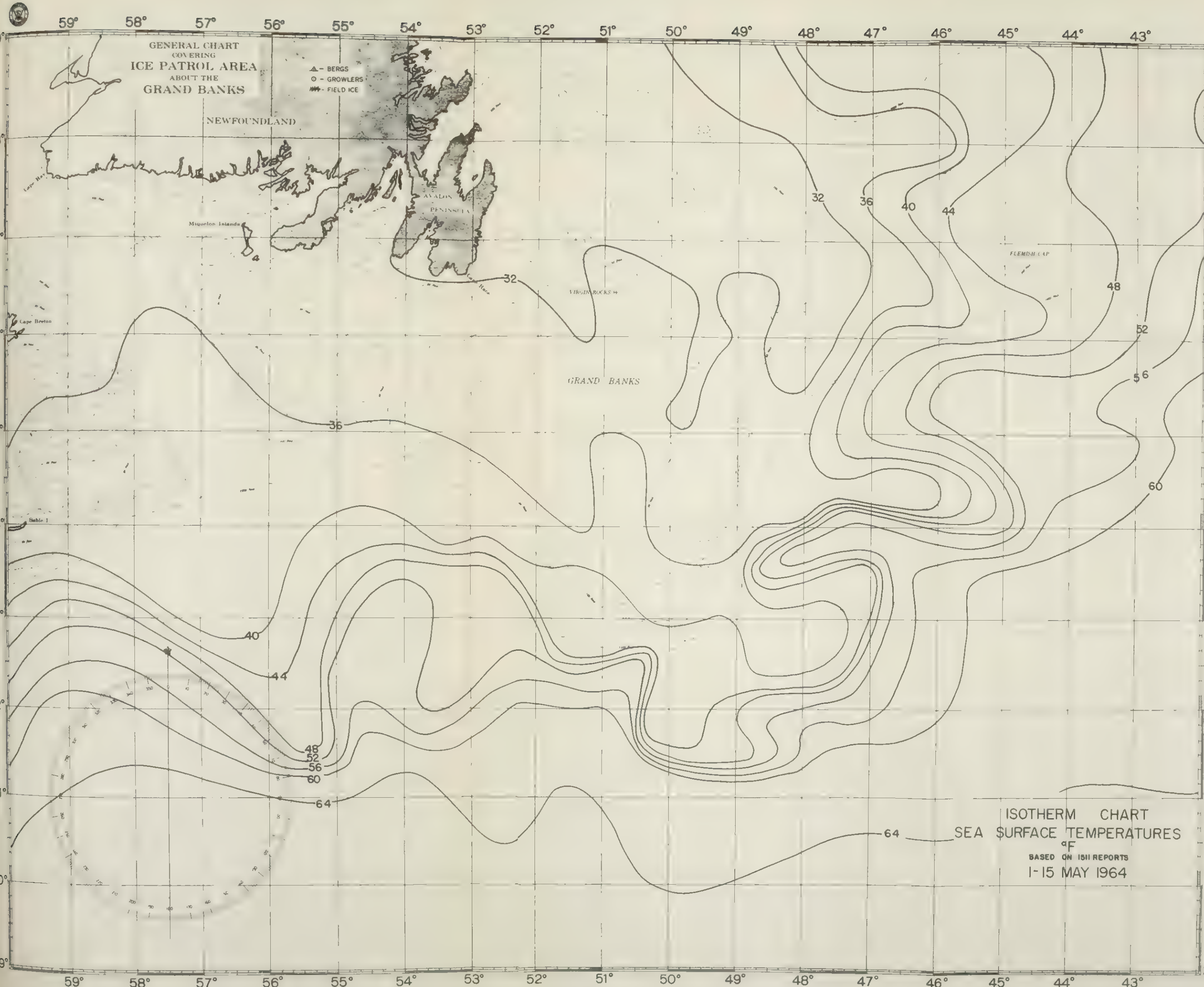

FIGURE 5.—Sea surface isotherms, 1–15 May 1964.

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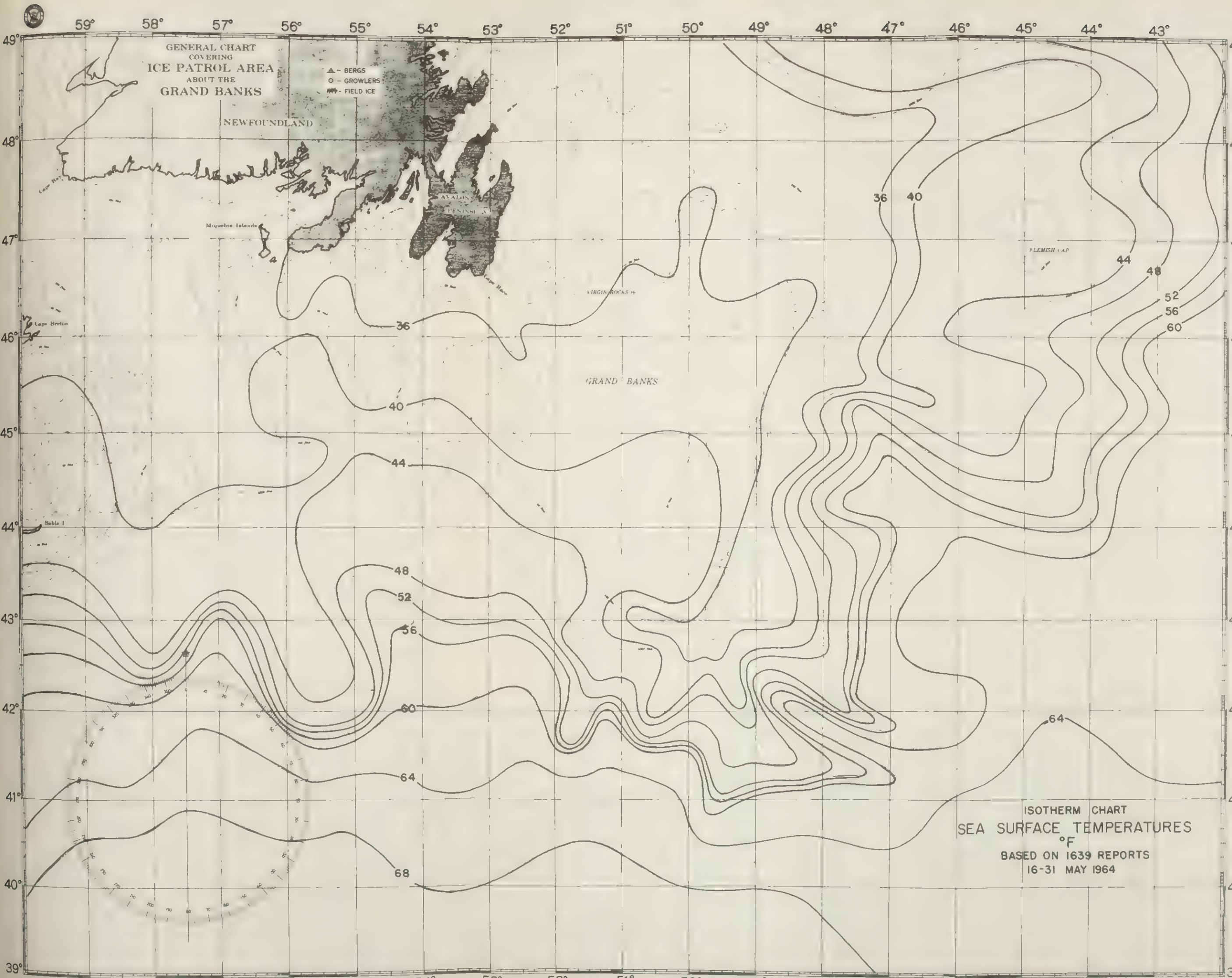

FIGURE 6.—Sea surface isotherms, 16–31 May 1964.

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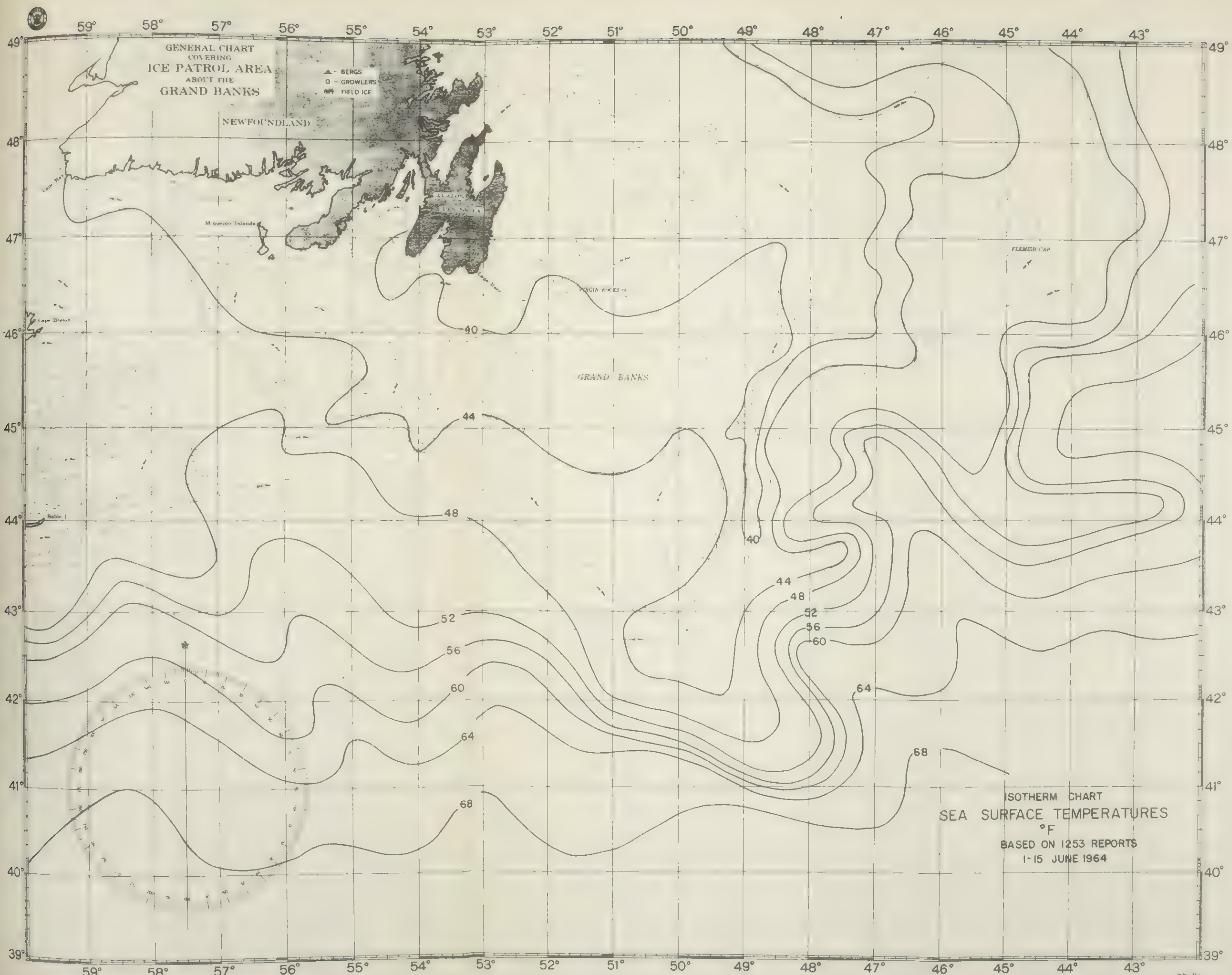

FIGURE 7.—Sea surface isotherms, 1–15 June 1964.

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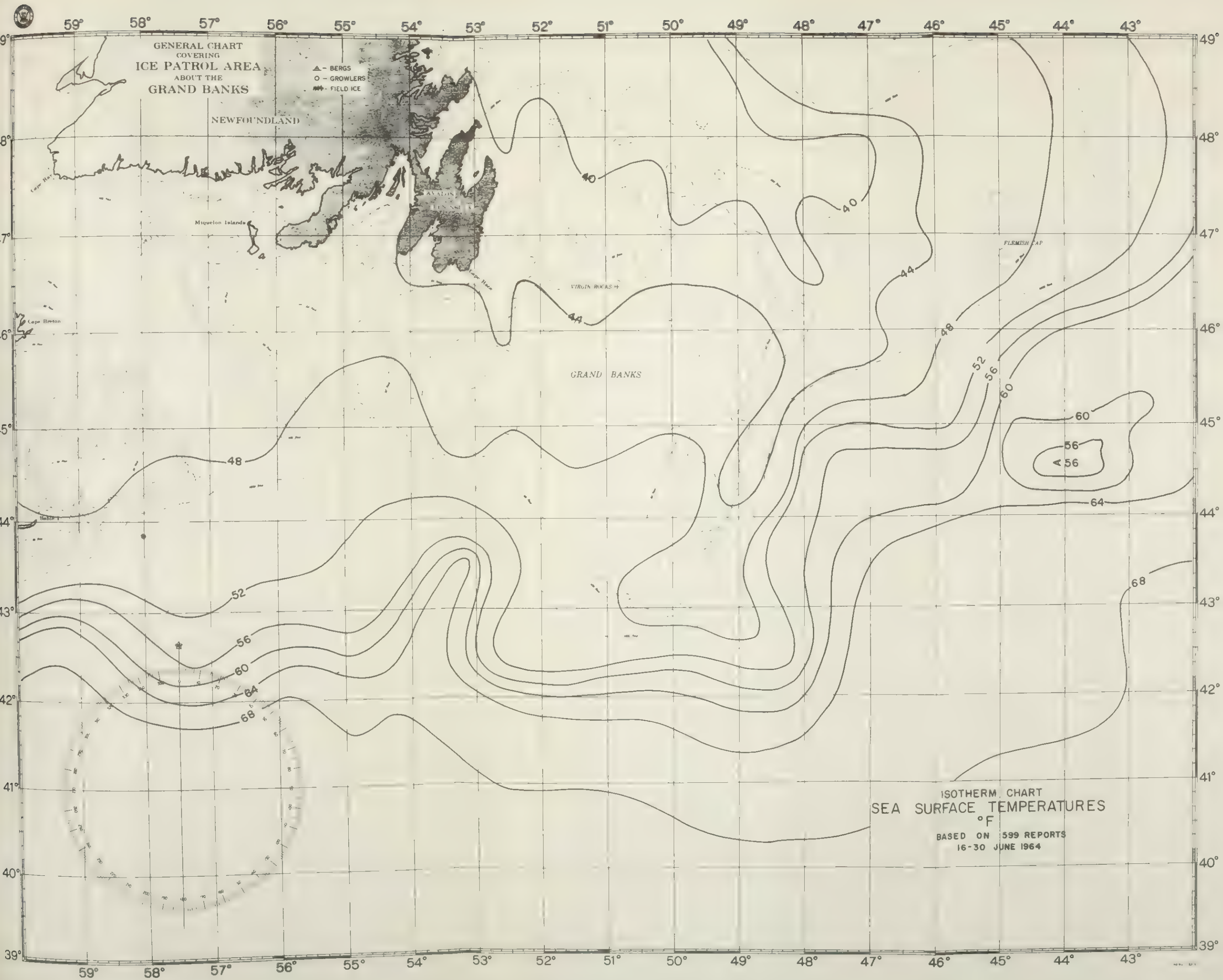

FIGURE 8.—Sea surface isotherms, 16–30 June 1964.

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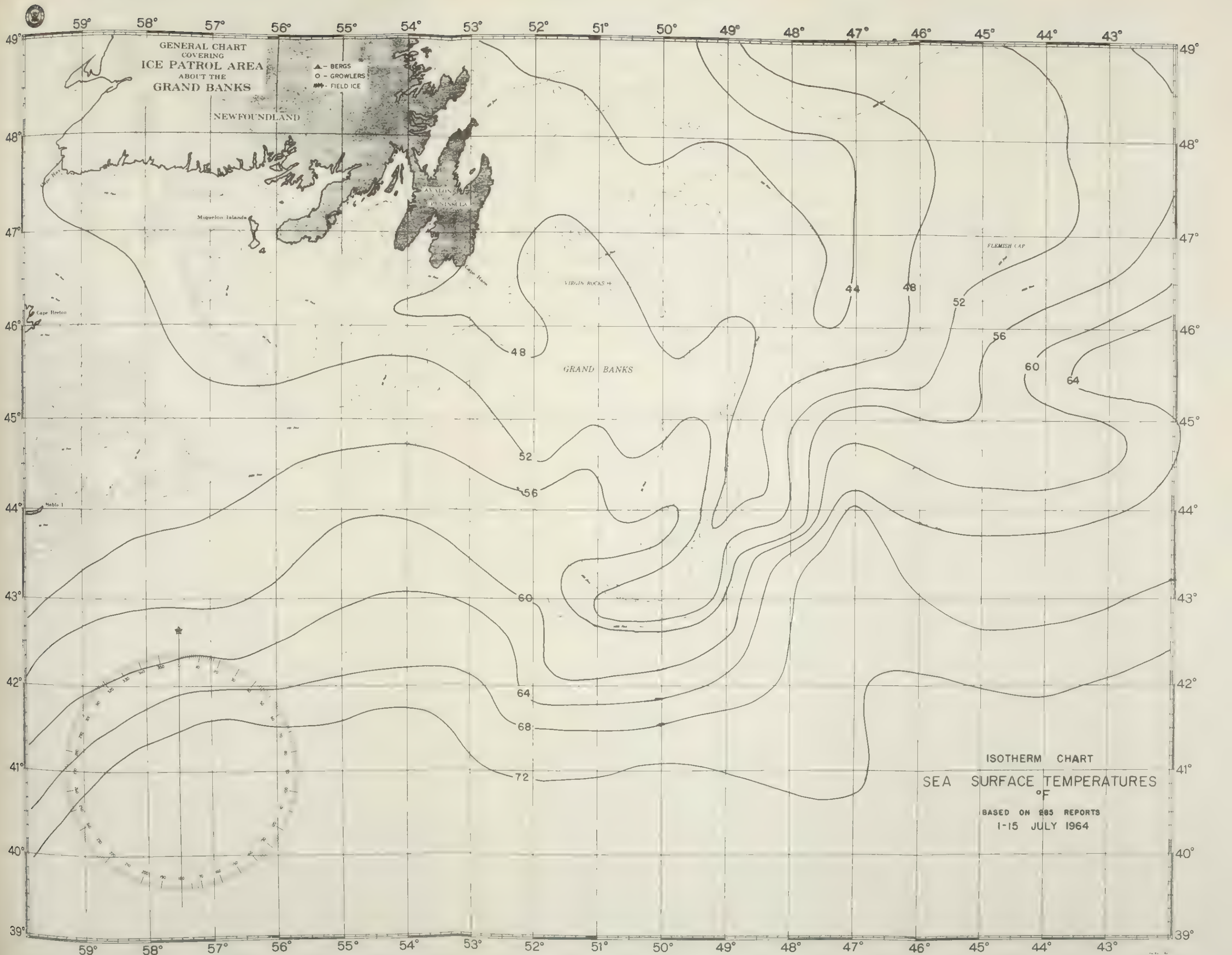

FIGURE 9.—Sea surface isotherms, 1–15 July 1964.

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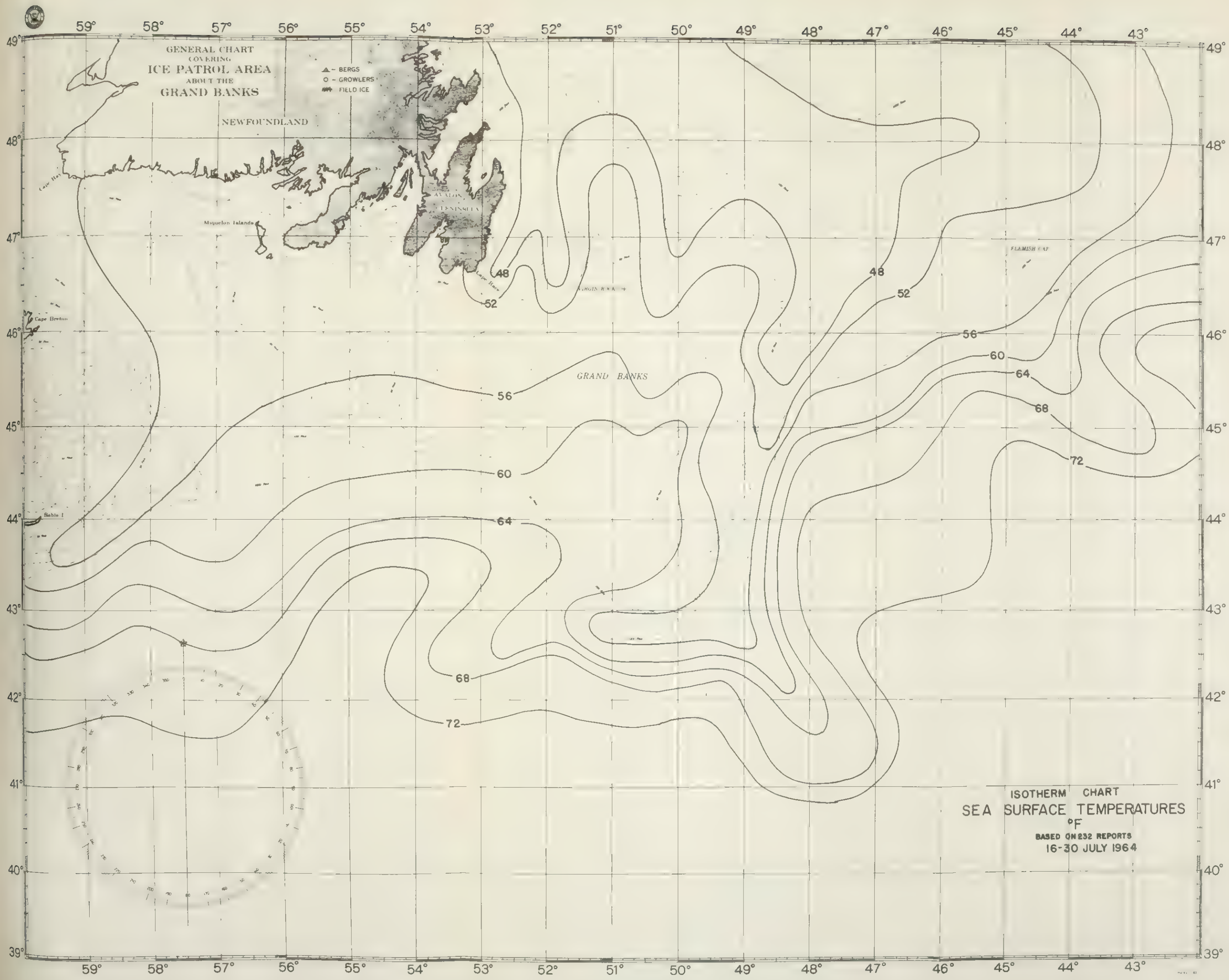

FIGURE 10.—Sea surface isotherms, 16–30 July 1964.

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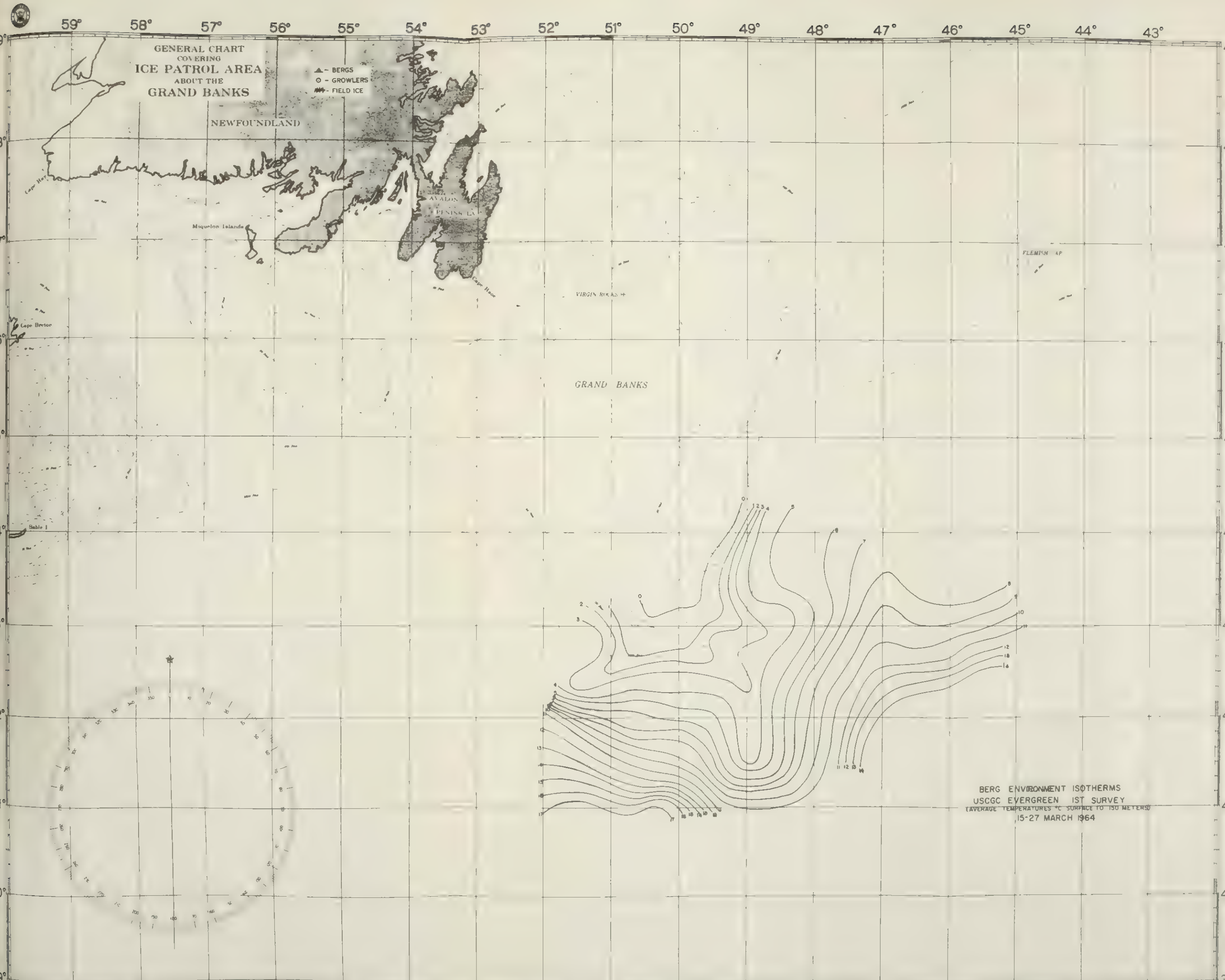

FIGURE 11.—Isotherms average sea temperature 0–150 meters, 15–27 March 1964.

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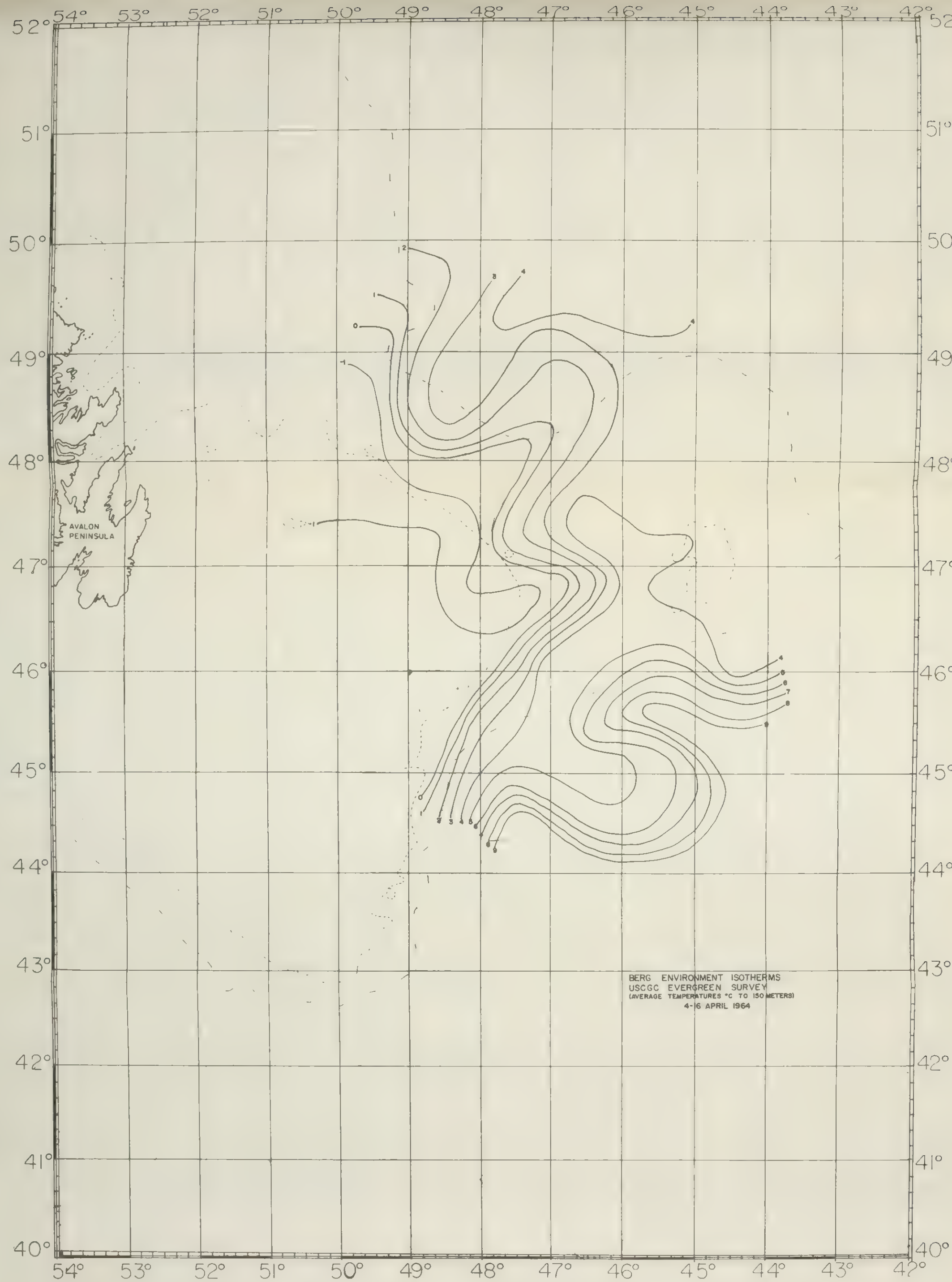

FIGURE 12.—Isotherms average sea temperature 0–150 meters, 4–16 April 1964.

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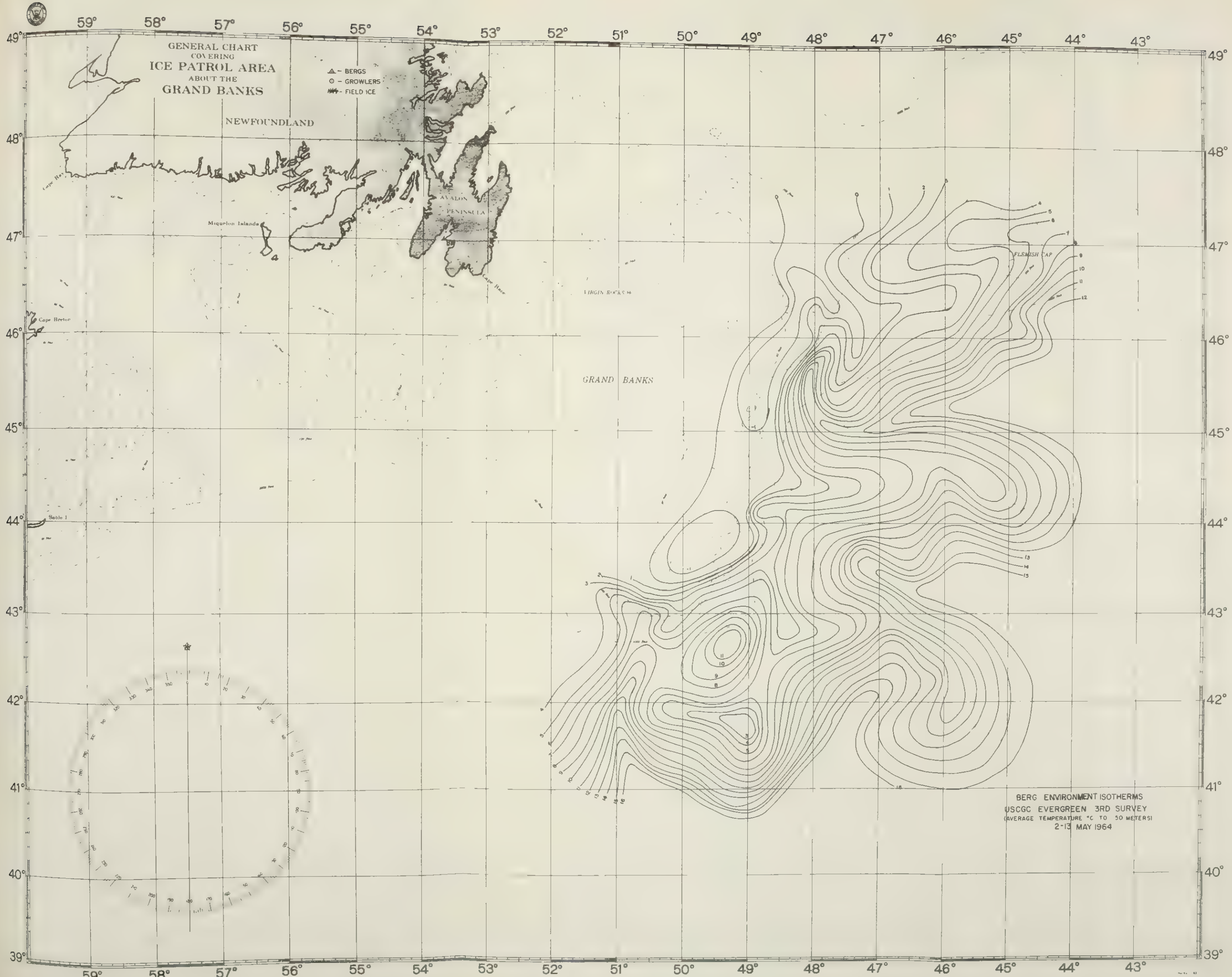

FIGURE 13.—Isotherms average sea temperature 0–150 meters, 2–13 May 1964.

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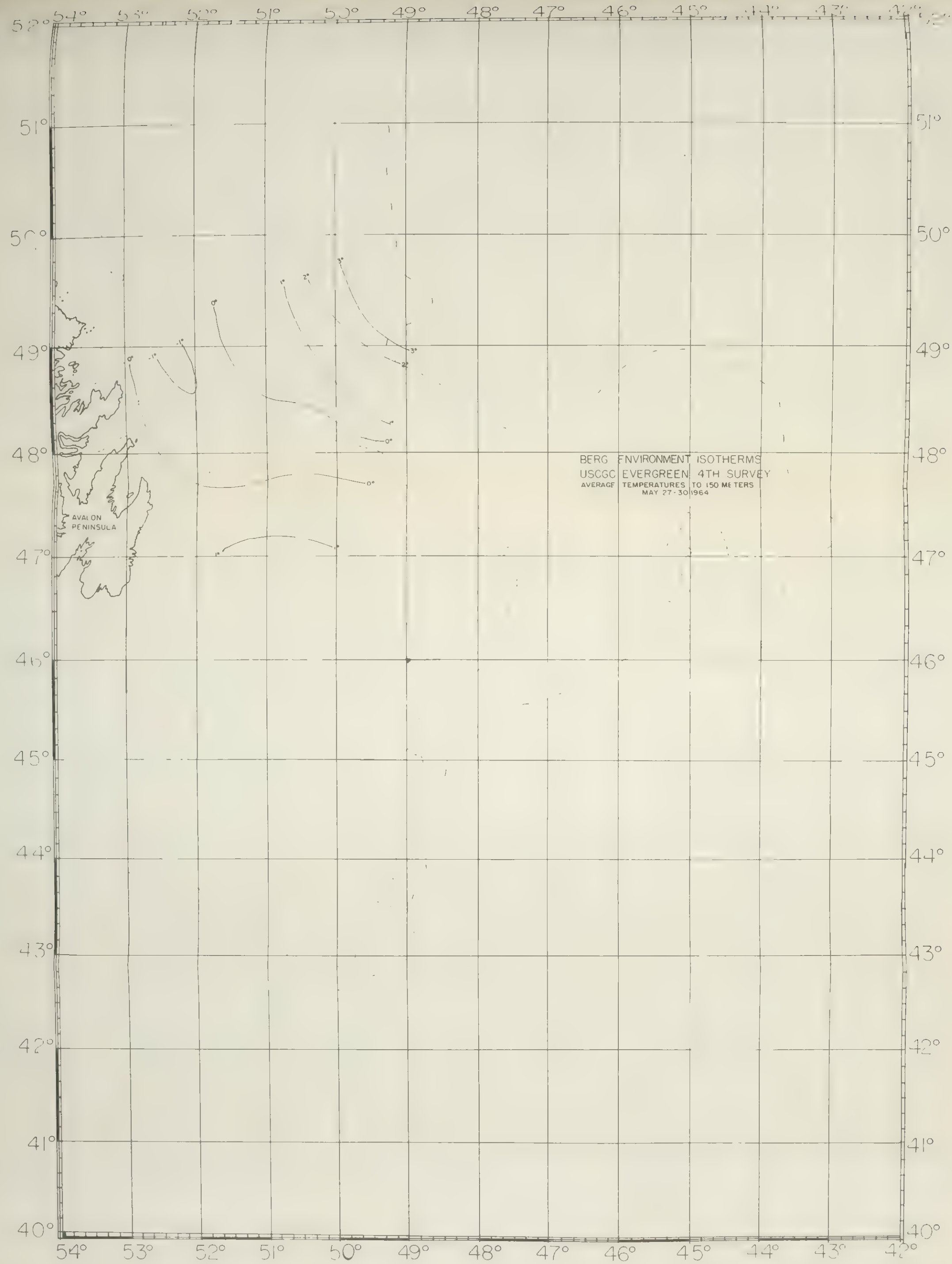

Figure 14.—Isotherms average sea temperature 0–150 meters, 27–30 May 1964.

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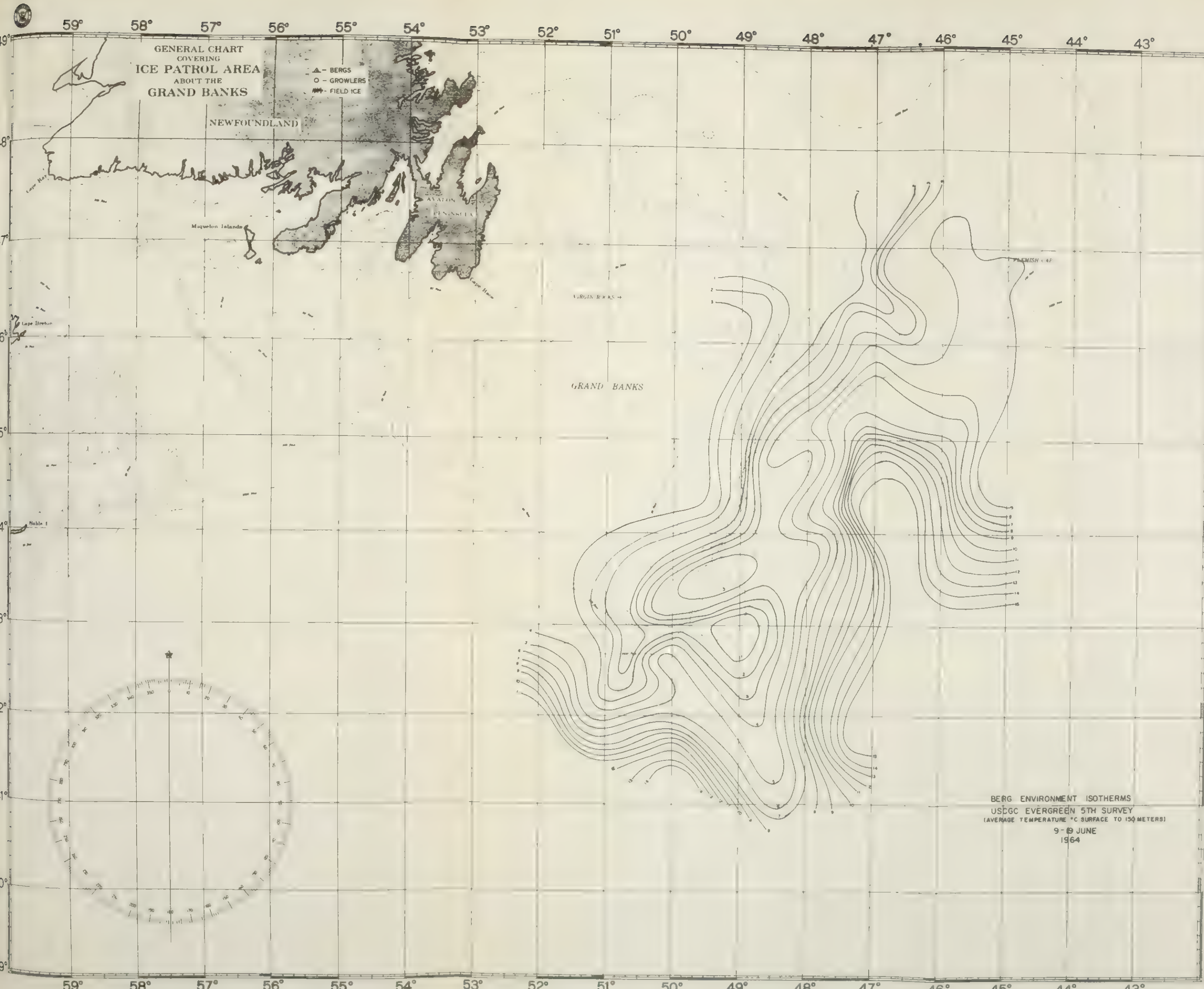

FIGURE 15.—Isotherms average sea temperature 0–150 meters, 9–19 June 1964.

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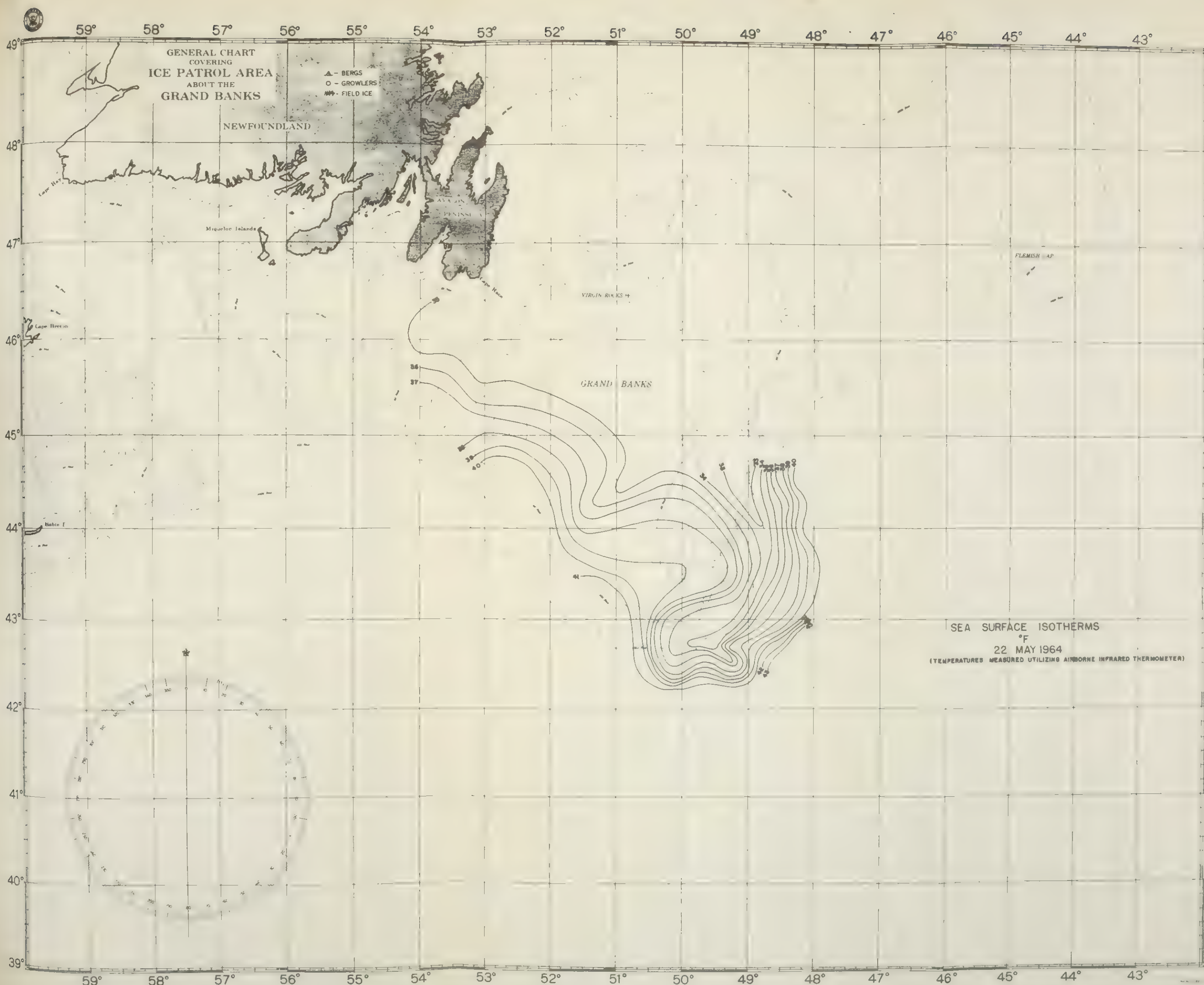

FIGURE 16.—Sea surface isotherms by airborne radiation thermometer.

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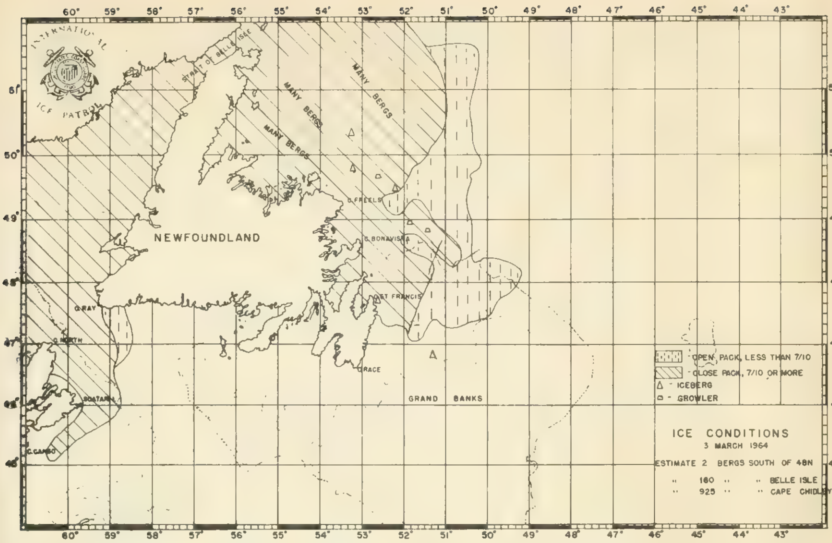

FIGURE 17.—Ice conditions Grand Banks on 3 March 1964.

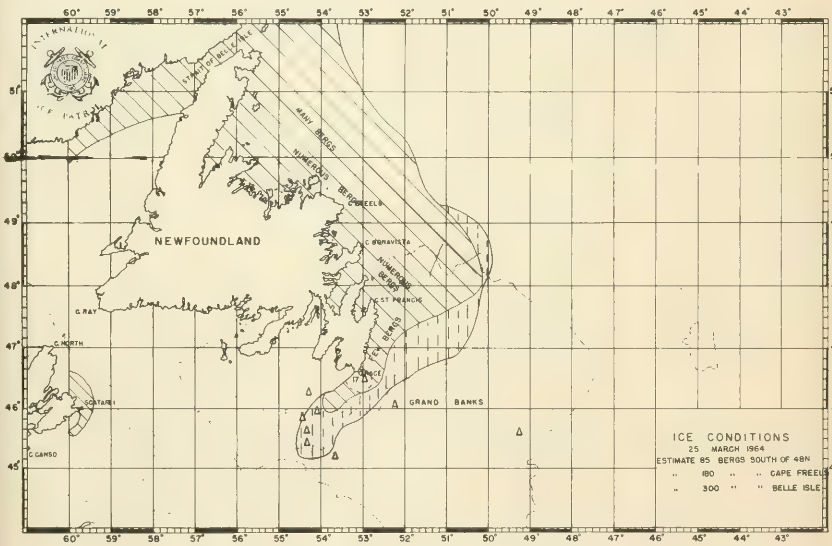

FIGURE 18.—Ice conditions Grand Banks on 25 March 1964.

driven to the south and west of Cape Race, and eventually grounded along the coast from Cape Race to Cape St. Mary.

At this time there was only one berg which was in position to threaten the effective Tracks D and C. This berg was a medium drydock type and was located just west of the Labrador Current at 46°25′ N., 49°25′ W. With average northeasterly winds until the 28th, this berg drifted to near 45°32′ N., 49°40′ W. where it was sighted as

two small bergs by the *Evergreen.* The small size and location of these bergs now made it extremely doubtful that they could reach the effective shipping tracks.

By the end of March an estimated 88 bergs had drifted south of 48° N., with all but one close along Avalon Peninsula. This total represents the greatest number of bergs drifting south of 48° N. in March since 1945. Surface winds were very favorable for berg drift south along the Newfoundland coast in March with northwesterly winds dominant as the first group of one hundred bergs arrived between the Grand Banks and Belle Isle and average northerly winds after the bergs passed Cape Freels. No bergs were known to drift south of 45° N. during March. The southernmost berg was located on the 25th at 45°25′ N., 53°45′ W., about 80 miles to the southwest of Cape Race.

While the sea ice limits remained fairly static most of February due to warmer than normal air temperatures in the area, with cold northwest winds from late February through mid-March the pack ice which contained numerous bergs rapidly encroached upon the northern Grand Banks and the east coast of Newfoundland extending to a maximum southeastern limit near 46°10′ N., 48°10′ W. on the 22d. Farther north the eastern limits generally were along 50° W. Maximum southwest limits were reached on the 25th about 90 miles southwest of Cape Race. The port of St. John's, Newfoundland was beset by heavy close pack ice during most of March. Gale force winds during most of the month assisted in destroying much of the pack ice near the limits. Also as the two isotherm charts for March (figs. 1 and 2) reveal the surface temperatures on the Grand Banks were about normal.

The Gulf of St. Lawrence was experiencing a heavy sea ice season. With abnormally cold temperatures in March, the entire Gulf was ice covered early in March. Average north-northwesterly winds predominated throughout March driving ice south from the northern Gulf to compact the southern Gulf with heavily ridged ice and young ice quickly formed replacing the ice driven south. Toward the end of March north-northeasterly winds and accompanying warmer temperatures did open up a lead along the western Newfoundland coast to Rich Point, but the remainder of the Gulf remained covered mostly with thick winter ice. Most of Cabot Strait was ice covered during March except that passage by Cape Ray was mostly open.

APRIL

The ice conditions in April were mostly determined by two distinct weather patterns. At the start of the month there were an estimated 85 bergs south of 48° N., all west of 51° W. and close along the coast except for one small berg at 45°08′ N., 48°50′ W. North of 48 N. to 52 N. there were an estimated 325 bergs all within 90 miles of the coast.

As a result of average strong west-southwesterly surface air circulation over Newfoundland and the Northern Grand Banks beginning in early April, the numerous bergs contained close in along the coast rapidly moved out to sea, most of them into the Labrador Current. By 11 April, 245 bergs had drifted east of 51° W. with the leaders at 46° W., between 48° N. and 49° N. At this time there were an estimated 205 bergs west of 51° W. and south of Belle Isle. Berg distribution by latitude was estimated as follows:

South of 48° N.	38
48° N.–50° N.	280
50° N.–52° N.	132

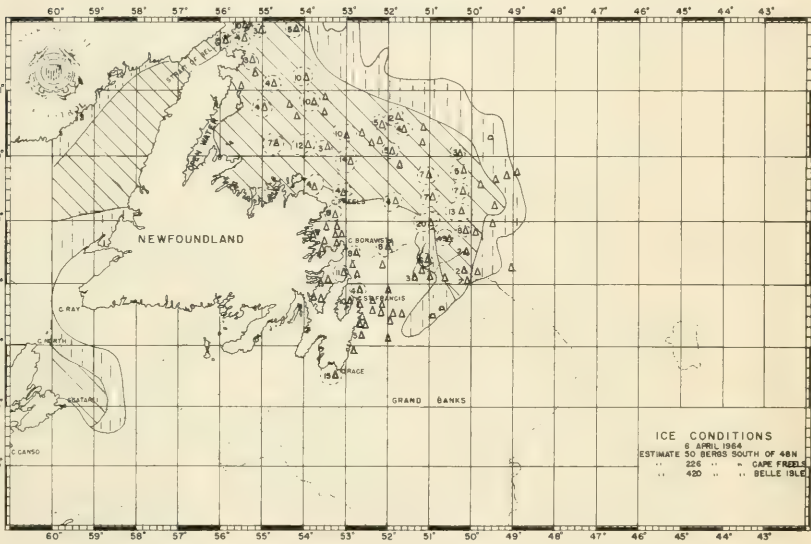

FIGURE 19.—Ice conditions Grand Banks on 6 April 1964.

The decrease in the number of bergs south of 48° N. from 1–11 April is mainly due to the fact that an estimated 35 bergs east of St. John's in early April were driven by the wind to the east-northeast several miles and back to north of 48° N. with some reentering the main branch of the Labrador Current. Bergs in the main branch of the current were traveling very rapidly out to sea. During the period 6–11 April under the combined forces of an estimated Labrador Current of 0.8 knots to the east-southeast and average southwest winds of 25 knots, bergs drifted eastward 180 miles at a rate of 36 miles per day. As bergs were approaching the northeast slope of the Grand Banks the prevailing southwesterly winds were driving them eastward out of the Labrador Current and to the warmer waters north of Flemish Cap and removing them as a threat to the major shipping lanes south of the Tail of the Banks. It is estimated that the first

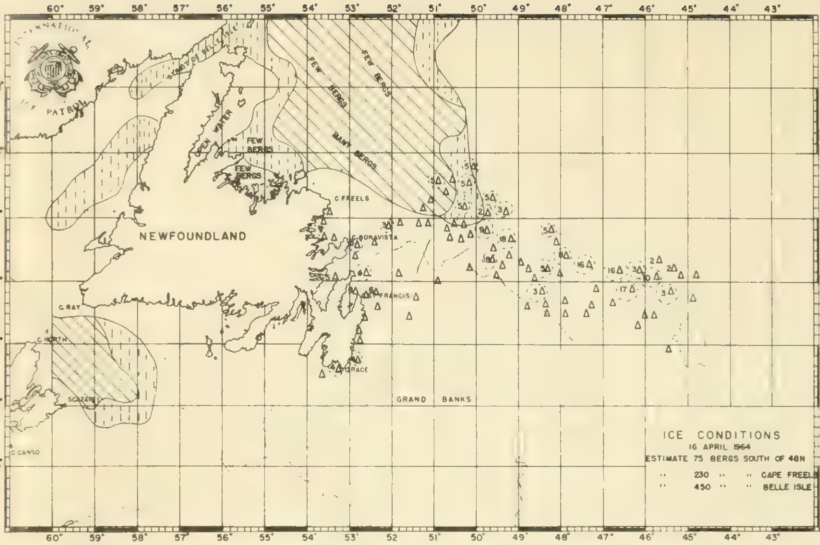

FIGURE 20.—Ice conditions Grand Banks on 16 April 1964.

85 bergs were driven eastward and permanently out of the Current by 19 April. The next large group of bergs were driven eastward out of the Current and across the 1000 fathom curve along 49° N. between 47° W. and 49° W. With a little northerly wind these bergs could easily drift back into the main branch of the Labrador Current.

On 19 April numerous bergs were scattered along the northern Grand Banks from the coast to Flemish Cap. The weather pattern abruptly changed with average strong northerly winds dominating until the end of April. See figure 40, the mean sea level pressure chart for the period 17 April–4 May 1964. As a result, bergs were driven south about 130 miles in 11 days. At the end of April, bergs were spread out from 54°30′ W. and the east coast of Newfoundland to 46° W. from 45°20′ N. northward with the greatest concentrations located south of Cape Race and on the central Banks near Virgin Rocks. An estimated 235 bergs crossed south of 48° N. from 19–30 April. All but about 20 of these bergs were removed from the main branch of the Labrador Current, with most of them probably permanently removed as a threat to Track B, then in effect. Of major concern now was the movement of the 20 bergs in the Current near 46° N., 47°30′ W. These bergs could reach the Tail of the Banks within a week and Track B within 10 days. While most of the bergs on the Grand Banks were permanently removed from the main branch of the Labrador Current, they were expected to be a menace to ships using the northern tracks for some time. The many smaller and southernmost bergs were expected to deteriorate within 2 to 3 weeks. The larger bergs in the colder waters near the coast, the larger bergs aground in the colder waters on the northern Grand Banks, and those

bergs on the eastern Grand Banks just west of the Current were expected to last for a longer period of time. Although the predominant surface winds were the main factor in the distribution of bergs at the end of April with the Labrador Current and branches a secondary factor, the bottom topography of the Grand Banks also played an important role. While large bergs are able to drift southward in the deeper waters close along the east coast of Avalon Peninsula and along the north and east slopes of the Grand Banks or seaward of them, they do ground along or inside the 100 fathom curve depending upon their draft. A solid dome type berg having a height of 200 feet can be expected to have a draft of about 600 feet based on an average 3/1 draft/height ratio. Accordingly, while bergs were being driven along the coast to the south of Cape Race and along the east slope of the Grand Banks regardless of size, only the smaller bergs were able to drift freely southward over the central portion of the Banks while the large bergs were grounding on the northern Grand Banks, and the medium size bergs were able to drift farther south depending on their draft prior to grounding. While the medium and small bergs were permanently removed from the Current in the central portion of the Banks and in relatively warmer waters, an estimated 15 large bergs grounded on the northern Grand Banks were in colder waters and in the vicinity of the Current. These bergs were large enough to last over 6 weeks.

When the weather pattern would cause a shift to southwesterly winds, the latter bergs were expected to drift back into the south-seeking Labrador Current. Therefore, this group remained as a latent potential threat to the major shipping lanes near the Tail of the Banks. In addition to the previously mentioned group of 20 bergs in the Current along the east slope of the Grand Banks, there were a few small and medium size bergs on the eastern Grand Banks scattered from 44°30′ N. northward and close enough to the Labrador Current to reach it under favorable westerly winds. Some of these bergs were considered large enough to survive to the Tail of the Banks. Although the berg threat was not great in numbers, the abnormally cold water temperatures (see figs. 3 and 4) increased the possibility of bergs reaching the Tail and effective Track B. It was noted that the sea surface temperatures cooled in April instead of warming as usual. This was due to a combination of (1) the invasion of very cold water brought down by the Labrador Current from Baffin Bay and Davis Strait which had experienced a very cold winter and (2) the April air temperatures which were about 3° F. below normal for the Grand Banks. An estimated total of 225 bergs drifted south of 48° N. during April. The combined March-April total of 313 bergs south of 48° N. is the highest since 1945, the second heaviest ice year on record.

The two weather patterns in April also had a marked effect on the sea ice conditions. Within a week strong southwesterly winds drove the sea ice rapidly offshore from coastal areas of Cape Race to Cape Freels to an eastern limit of 49° W. with a 25-mile belt extending 100 miles further eastward along 48° N. by 11 April. The sea ice east of 50° W. rapidly disintegrated by 16 April due to a combination of heavy wave action from storms, the warmer offshore waters, and the opening up of the pack ice. As the northerly winds returned, heavy pack ice, in abundant supply to the north, was driven south to once more close in on the east coast of Newfoundland. Conditions in Notre Dame Bay were extremely bad with the pack ice under heavy pressure and heavily ridged. A few sealing vessels, which had entered Notre Dame Bay in the earlier part of the month when southwest winds had opened up a lead, got into serious difficulty; and one large wooden sealer was crushed and sunk. Even the Canadian Department of Transport icebreakers experienced considerable difficulty navigating into Notre Dame Bay to rescue the sealing vessels caught there.

The sea ice in the Gulf of St. Lawrence slowly deteriorated as the ice limits gradually retreated and the ice cover diminished so that by the end of April, the Gulf was open water except for the usual lingering ice surrounding Cape Breton Island and ice in the Northeast Arm. The route through the central Gulf and into the St. Lawrence River was considered navigable by 5 April, which is about normal. However, the Canadian Department of Transport icebreakers had been getting ships through the Gulf and to the various ports during the entire winter by the escort system. The St. Lawrence Seaway was reported open on 8 April, the earliest opening date on record due to a mild winter in the Great Lakes and upper St. Lawrence River region.

MAY

On 1 May a potential major threat to Track B existed in the form of 20 bergs traveling south in the Labrador Current near 46° N., 47°30′ W. Also to be watched were the group of 15 large bergs temporarily aground on the northeast Grand Banks and about 12 small and medium bergs just west of the Current on the eastern Grand Banks between 45° N. and 49° N. See figure 21, ice conditions 1 May 1964. On the basis of the preseason northern berg survey of 27–28 February and a northern flight on 6 April, it was known that a marked berg gap existed after the first heavy concentration, which had already arrived at the Grand Banks. Accordingly it is estimated that there were relatively few icebergs north of the Grand Banks to Belle Isle and many north of Belle Isle. As winds averaged onshore in this area during the last two weeks of April, it was considered that

all, if not most, of these bergs were close ashore with many trapped or grounded temporarily. If these conclusions were correct, any threat to the major shipping lanes until late June was restricted to the former three groups mentioned.

Although winds averaged northerly over the northern and western Grand Banks during early May, winds were west-northwesterly near 46° N., 47°30′ W. driving all 20 bergs to the southeast and out of the Labrador Current into warmer waters. The major threat to Track B quickly dissipated as these bergs deteriorated within 12 days with a couple reaching 45°30′ W. in the Gulf Current before perishing.

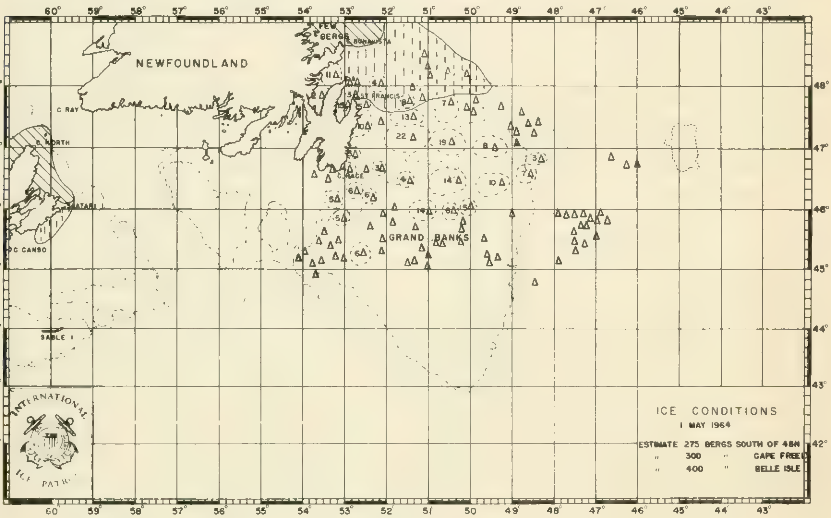

FIGURE 21.—Ice conditions Grand Banks on 1 May 1964.

None of the 20 bergs were able to drift south of 44° N. Attention was now centered on about 10 small and medium bergs just west of the Labrador Current on the eastern slope of the Grand Banks. Four of these bergs had been driven south from near 48°30′ N., 49°30′ W. to near 44°30′ N., 49°30′ W. and were a minor threat to Tracks C and B. As a result of west-northwest winds in early May, these bergs were redriven into the Current. However, these bergs, which were badly weathered and small in size, lasted only a few days, a couple of them drifting south to near 43° N. before deteriorating. The southernmost penetration of glacial ice for 1964 took place at this time in the form of two growlers reported at 42°58′ N., 48° W. Except for two additional small bergs, no other ice was able to drift south of 44° N. until the end of May. These two bergs were all that remained of the group of 12 just west of the Current in early May. Both drifted south of 44° N. in mid-May, but neither managed to last long enough to drift south of 43° N.

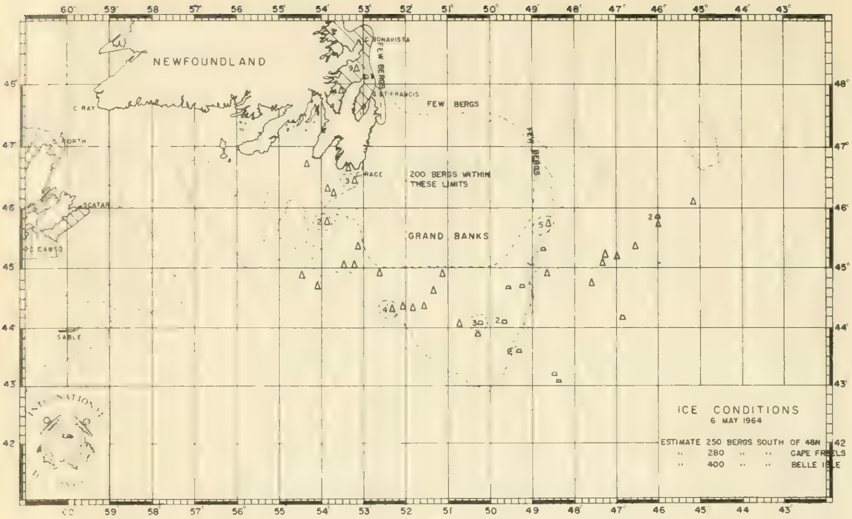

FIGURE 22.—Ice conditions Grand Banks on 6 May 1964.

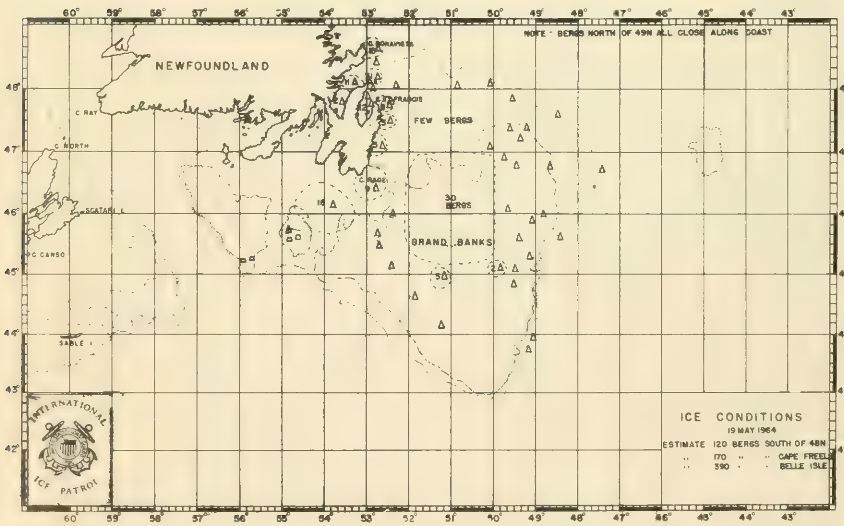

FIGURE 23.—Ice condition Grand Banks on 19 May 1964.

The deterioration of the many bergs on the Grand Banks was comparatively slow due to abnormally cold sea temperatures. See figures 51 and 52, normal charts for May and figures 5 and 6, this year's May isotherm charts. The bergs in the warmer waters of the southern and central Grand Banks were the first to perish while those bergs in the colder coastal waters and colder waters near or in the Labrador Current persisted longer. On 22 May, 80 bergs remained south of 48° N. and the southern limits of bergs on the central Grand Banks

had receded to north of 45° N. By I June, 60 bergs remained south of 48° N. while the southern limits receded to north of 46° N. except for a couple of bergs in the Labrador Current. While most of these bergs were not threats to Tracks C and B, many were a threat to Tracks E and F, which were being used by ships plying Canadian ports and ships using the St. Lawrence Seaway.

The predominant winds along the east coast of Newfoundland and Labrador for the first 3 weeks of May were north-northwesterly and mostly paralleled the coast except in the Notre Dame Bay area, where these winds were onshore. Only a couple of the 10 large bergs grounded on the northeast slope of the Grand Banks at the start of May made any significant progress toward the Tail of the Banks by the end of May. At this time three bergs now classified as small had reached 45° N. There were no other known bergs south of 47° N. On the basis of the known upstream distribution of bergs in early April and the prevailing onshore winds in the areas north of the Grand Banks, the conclusion by mid-May was that there were very few, if any, bergs in the Labrador Current north of the Grand Banks to perhaps Belle Isle. Thus with the major threat to Tracks C and B having evaporated, only a very minor intermittent threat to these Tracks remained at least until late June. This conclusion was fortified by fact, as a flight on the 19th determined only a couple of offshore bergs from 48° N. to 53° N There were approximately 200 bergs close ashore between Cape Bonavista and 51° N. There had been a southward movement of many bergs from north of Belle Isle during the past 6 weeks, but these bergs became trapped and accumulated near Notre Dame Bay. Any major threat to Tracks B and C for the remainder of the ice season would have to originate from this group. As southwest winds soon arrived, many of these bergs began to drift into the Labrador Current and rapidly out to sea with the leaders reaching 48°30′ W. by the end of May. See figure 42, mean sea level pressure 20 May–1 June, 1964. With existing cold water temperatures and possible winds favorable for drift south, this group of bergs could become a major threat to Track C by late June and early July. An estimated 19 bergs drifted south of 48° N. in May, which was well below normal and a sharp drop from the high April total. This low number can be directly attributed to the fact that prevailing winds from mid-April to mid-May were slightly onshore, driving the many upstream bergs close into shore, considerably delaying their southward progress.

A combination of cold north-northwesterly winds, abnormal cold water temperatures, and an abundant supply of heavy pack ice from the north kept sea ice in the bays and along the east coast of Avalon Peninsula until 20 May. The pack ice was especially heavy and abundant in Notre Dame Bay and maintained by onshore winds there until the fourth week of May when a narrow band of pack ice moved rapidly

east into the Current under southwesterly winds to 50°30′ W. and south to 49° N. The disintegration matched the supply in this area of the southeast sea ice limits for the remainder of May. The only ice remaining in the Gulf of St. Lawrence area at the start of May was a 30–40 mile band of ice around east and west Cape Breton Island and the usual ice in the Northeast Arm and Belle Isle Strait. The ice around Cape Breton completely disintegrated by 15 May at which date the Canadian Department of Transport concluded aerial ice reconnaissance and ice forecasts for the Gulf.

JUNE

The major shipping lanes were ice free at the start of June. Three small bergs in the Labrador Current near 45° N., 48° W. were a minor threat at this time. There were nine various-sized bergs about 200 miles farther upstream between 47° N.–48° N. A couple in this group had been mostly aground on the northern Grand Banks since mid-April, and the rest were the leaders of the many bergs kept close ashore from Cape Bonavista northward until about 20 May. Only one or two of these bergs were given a chance to reach the Tail of the Banks. The others were expected to deteriorate prior to the end of the month. While the above two small groups of bergs were of immediate concern as possible minor threats to Tracks C and B, there was considerable interest in the many bergs which had drifted into the Labrador Current during the last 2 weeks of May from the Bonavista Bay and Notre Dame Bay region. A flight on 1 June revealed about 100 bergs in or near the Labrador Current along the northern Grand Banks between 49°30′ W. and Cape Freels. There was a group of about 25 bergs near 48°50′ N., 50° W., a group of 20 bergs near 49° N., 52° W., and about 40 bergs near Funk Island. See figure 24, ice conditions 1 June 1964. These bergs were cause for future concern because it was estimated that even the northwesternmost group of 40 bergs near Cape Freels could reach the Tail of the Banks within 5 weeks or by early July under conditions favorable for survival and drift to the east and then south. The concern of a possible major threat to the major shipping lanes by July was accentuated by three factors in addition to the available supply: (1) The sea surface temperatures for 15–31 May (see fig. 8) were 2°–4° F. below normal; (2) Track B was scheduled to shift 100 miles northward to Track C on 1 July; and (3) Berg sizes were larger than average for this time of year on the northern Grand Banks due to longer than normal containment in pack ice.

The southernmost three bergs posing a minor threat to shipping at the Tail of the Banks all deteriorated by 12 June without achieving drift south of 43° N. In the meantime the next group, consisting of nine bergs, had failed to achieve any significant progress toward the

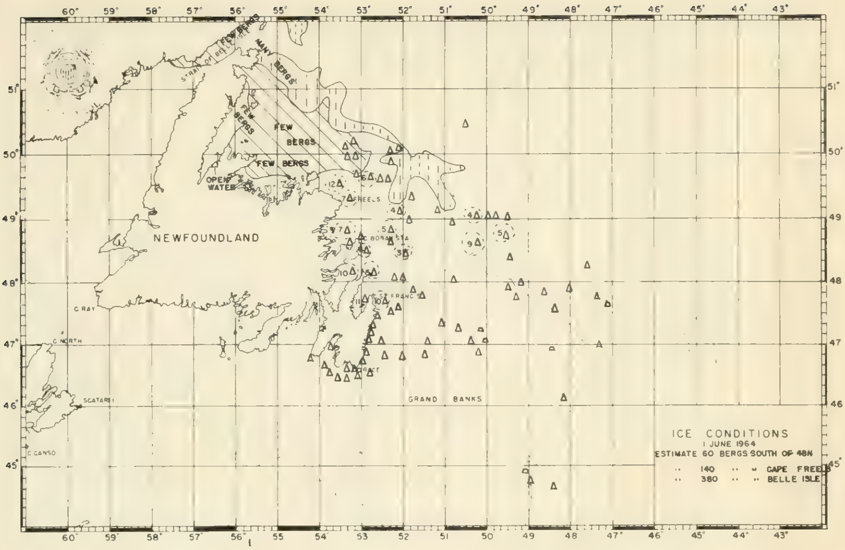

FIGURE 24.—Ice conditions Grand Banks on 1 June 1964.

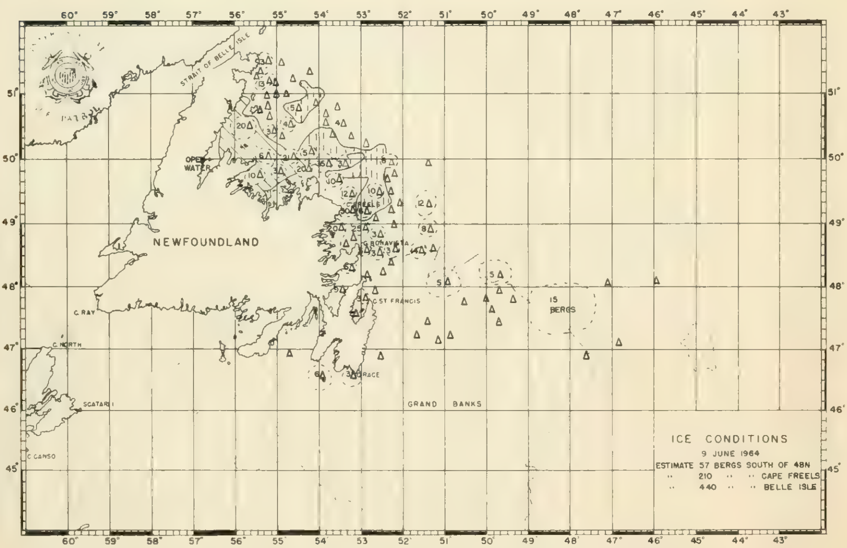

FIGURE 25.—Ice conditions Grand Banks on 9 June 1964.

Tail of the Banks. All but one of these bergs is believed to have deteriorated prior to crossing 47° N. As winds were light and variable the first 10 days in June, the bergs on the north slope of the Grand Banks were moved primarily by the Labrador Current at a rate of about 10 miles per day to the east-southeast. On 12 June there were no known offshore bergs south of 47° N. There were an estimated 40 bergs south of 48° N. with 20 on the northeast slope of the Grand

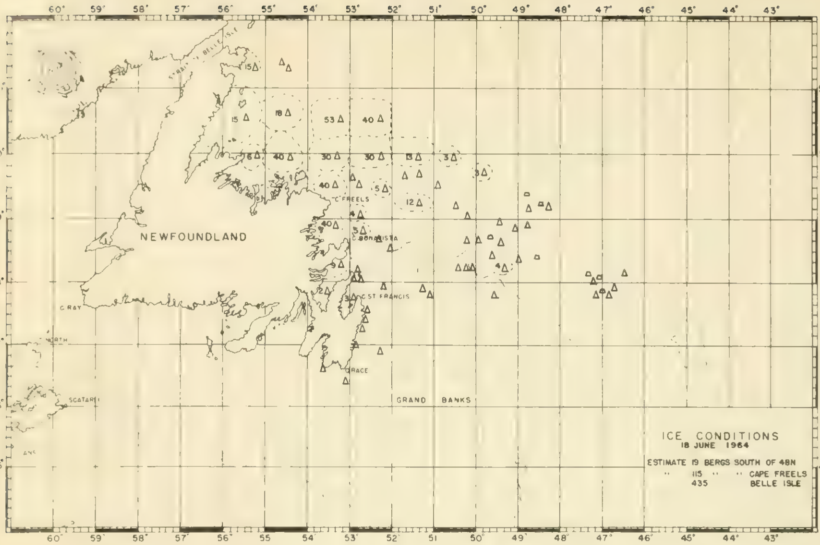

FIGURE 26.—Ice conditions Grand Banks on 18 June 1964.

Banks between 47° N.–48° N. and 15 bergs close along Avalon Peninsula. Upstream in the Labrador Current there were an estimated 30 bergs between latitudes 48° N.–49° N. and longitudes 49° W.–51° W. with many more bergs to the north and west. At this time the weather pattern changed with a shift in the Azores high to the northwest causing lows to move northwest of Newfoundland and resulting in south-southwesterly winds over the Grand Banks for the remainder of the month. See figure 44, mean sea level pressure for the period 13–30 June 1964. Consequently, bergs were driven to the northeast out of the main branch of the Labrador Current as evidenced by flights on the 17th and 18th. At this time there were only 4 bergs east of 48° W., all near 48° N., 47° W. with about 15 other bergs east of 50° W. and only a couple large enough to reach Track C. Of the nine bergs on the northeast slope of the Grand Banks on 1 June, only one remained. Of the 25 bergs near 48°50′ N., 50° W., only 3 remained. In spite of an abundant supply upstream, the deterioration was exceeding the supply. It was now obvious that no threat existed to Track B and only a very minor threat to Track C was possible the remainder of the year.

A flight on the 30th revealed only 4 bergs south of 48° N. and only 11 bergs east of 50°30′ W. The southernmost offshore berg was in the main branch of the Labrador Current at 47°40′ N., 46°56′ W. This berg was a solid medium-sized dome berg and was expected to last about 2 weeks and not long enough to reach Track C. With considerable warm air flow over the Grand Banks and vicinity during the last 3 weeks of June the sea surface temperatures were almost back to normal. See figure 8, isotherm chart for 16–30 June. While any

berg threat to Track C was now remote, northern Track F was expected to be threatened by bergs well into July. An estimated 28 bergs crossed 48° N. during June, well below the 64-year June average of 66.

Sea ice conditions along the northeast Newfoundland coastal areas were worse than average, particularly in Notre Dame Bay. In early June a 40 to 60 mile wide belt of close to open pack ice extended from just north of Funk Island to 51° W. with scattered floes east to 49° W. As southwesterly winds prevailed during mid-June, the pack ice was driven out to sea where deterioration was rapid in the warmer waters. By 20 June the sea ice limits had receded to north of Belle Isle. Belle Isle Strait was believed navigable by 6 June, or about 1 week ahead of schedule, although there were numerous bergs and some open pack ice there and in the eastern approaches. By the end of June the sea ice limits receded north of Hamilton Inlet to 55° N.

JULY

At the beginning of July a few bergs, mostly medium-sized, were located in or near Track F. Also there was a group of about 20 bergs near 49°20′ N., 51° W. in the Labrador Current and approaching Track F. See figure 27, Ice Conditions 1 July 1964. The prevailing winds in the area for July were southwesterly. See figure 15, mean sea level pressure for the period 1–31 July 1964. As the Azores high was located at its usual position for July, summer weather conditions existed over the Grand Banks accompanied by prolonged periods of calms or light winds. The movement of the few bergs threatening

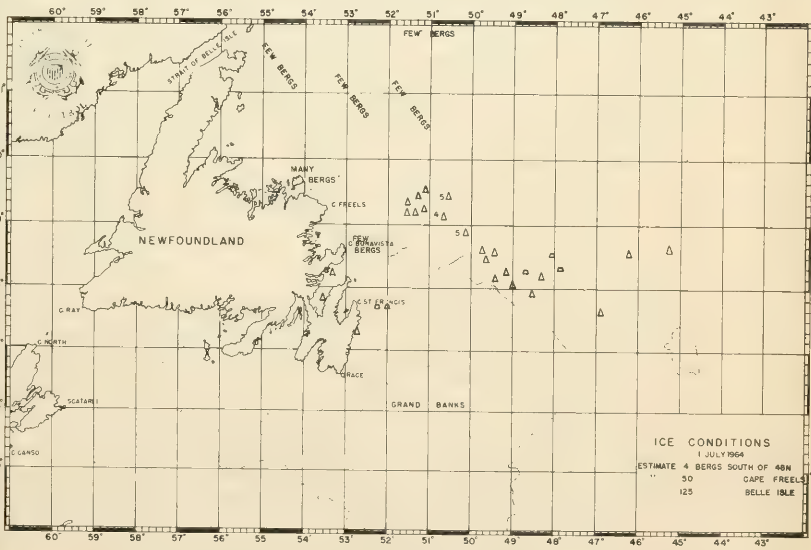

FIGURE 27.—Ice conditions Grand Banks on 1 July 1964.

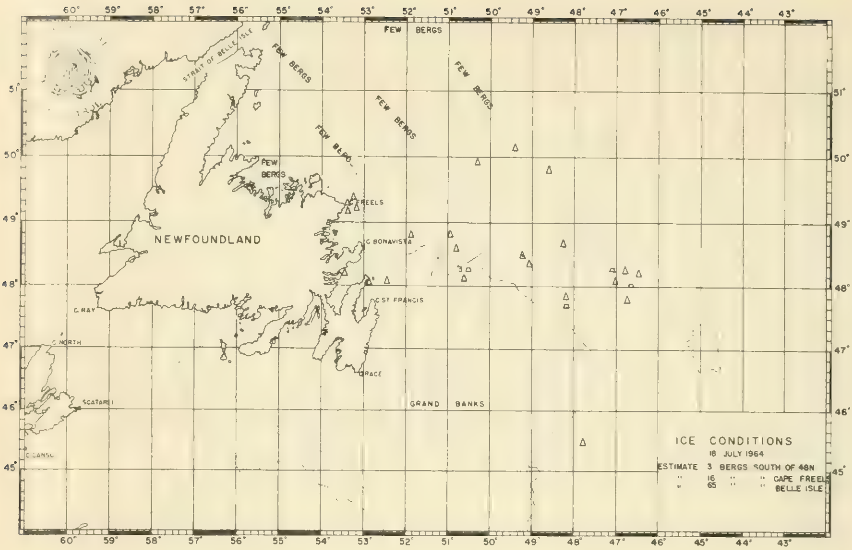

FIGURE 28.—Ice conditions Grand Banks on 18 July 1964.

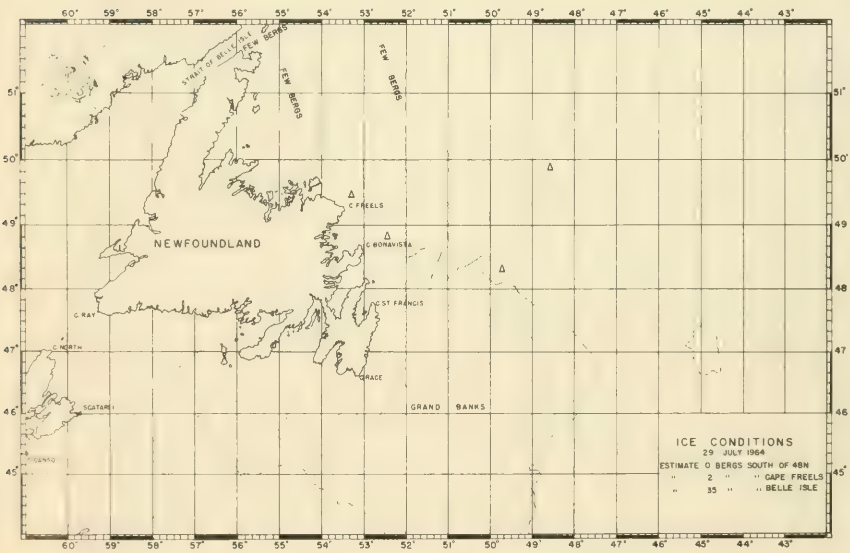

FIGURE 29.—Ice conditions Grand Banks on 29 July 1964.

Track F near the northern Grand Banks was mainly governed by the Labrador Current. The few survivors that reached the northeast slope of the Grand Banks drifted to the northeast and out of the main branch of the Current. The prevailing southwesterlies, while light, apparently had sufficient driving force to accomplish the above and possibly the Labrador Current, salient to the northeast in this region,

was stronger than normal. A couple of bergs drifted east to 45° W. with one reported July 4 at 49°20′ N., 44°28′ W., the easternmost position of ice for the year. Two bergs were exceptions and remained in the main branch of the Current. The first drifted south to within 100 miles of the Tail of the Banks and effective Track C before deteriorating. It was last reported as a growler on the 18th at 44°45′ N., 47°30′ W. The second berg managed to drift south to 46°20′ N., 47°15′ W. before deteriorating on the 26th.

A surprising feature of the month was the fact that bergs survived longer than expected. As a result, ships using Track F were threatened by a few bergs throughout the month. Three main factors are believed responsible for the persistence of bergs on the northern Grand Banks and vicinity as follows: (1) Late June and July calm weather with less resultant berg erosion; (2) Colder than normal sea temperatures; and (3) The lateness of pack ice in Notre Dame Bay, where these bergs were temporarily located until mid-June. The importance of the first factor was validified by aerial sightings finding a notable lack of brash and growlers around the bergs. The condition of the sea may be as important a factor in berg deterioration as the sea water temperature, especially during periods of abnormal cyclonic activity and abnormally calm periods. By the end of July, only one berg, located at 48°20′ N., 48° W., remained a threat to ships using Track F. There were only two other bergs south of 50° N., neither of which was expected to reach Track F. The supply of bergs from the north was very small at this time due to the fact that the region off the Labrador Coast from Belle Isle northward was dominated by moderate west-southwesterly winds which drove most of the bergs in this area well out to sea and warmer waters. Many of the latter were driven to the east out of the south-flowing Labrador Current. Ships using Track G reported many bergs in Belle Isle Strait and approaches east to 50° W. until the end of the month, at which time there was a noticable decrease of reports. Sea ice limits gradually retreated from near 55° N. in early July to 58° N. by the end of the month. An estimated 5 bergs drifted south of 48° N. during the month.

AUGUST

One berg remained on the northeast slope of the Grand Banks until it deteriorated about 10 August. By this date there were no known offshore bergs south of 50° N. and none are believed to have crossed this latitude for the rest of the month. At the end of August an estimated 3 bergs remained south of Belle Isle with the southernmost near 50° N., 50° W. Ship reports of bergs in Belle Isle Strait and approaches decreased considerably from July. From mid-August on, there were only a couple of ice reports from this area. The sea ice limits are estimated to have receded from 58° N. to Hudson Strait

entrance during the month. Ice conditions in eastern Baffin Bay, where the major berg-producing glaciers are located, were reported as the worst in many years. There are two factors which probably caused this situation, namely the predominance of onshore winds and abnormally cold climatology in the area during this summer. On the other hand, ice conditions in western Baffin Bay were estimated about normal. One berg drifted south of 48° N. for an estimated total of 369 bergs, or slightly below the 64-year average since 1900.

SEPTEMBER

Only three or four bergs managed to drift south of Belle Isle during the month. A berg was reported on the 8th at 50°05′ N., 50°08′ W., and two bergs were sighted on the 21st, one at 49°40′ N., 53°18′ W. and the other at 51°20′ N., 55°05′ W. These bergs are estimated to have deteriorated by the end of September with no new arrivals south of 51° N. Aerial ice reconnaissance flights were made on 21 and 22 September for the purpose of determining ice conditions from the Grand Banks to Hudson Strait entrance. The area from the Labrador east coast to 80 miles offshore was covered with a visual effectiveness of 85 percent. A total of 178 bergs, including 26 radar targets which were presumably bergs, were counted with the following distribution:

Area	Berg size			Total
	Small	Medium	Large	
South of 52° N	1	2	0	3
52° N to 54° N	18	10	1	29
54° N to 56° N	24	10	1	35
56° N to 58° N	33	14	1	48
58° N to Cape Chidley	54	21	4	79
Cape Chidley to 61°20′ N	1	8	1	10
Total	131	65	8	204

It was noted that north of 57° N., 85 percent of the bergs were within 10 miles of the coast and probably aground temporarily. South of 57° N. most of the bergs were over 20 miles offshore. Onshore winds prevailed north of 57° N. and alongshore or offshore south of 57° N. during the preceding few weeks. Only a couple of the bergs were considered large enough to survive to the Grand Banks in the next 3 months. Belle Isle Strait and approaches were expected to be intermittently threatened as usual for the remainder of the year. No pack ice was observed on the 22 September survey. For a detailed plot of ice conditions 21–22 September, see figure 30. This marked the first effort by the International Ice Patrol to determine ice conditions along the Labrador coast each month during the offseason period. Similar monthly flights are planned until next ice season.

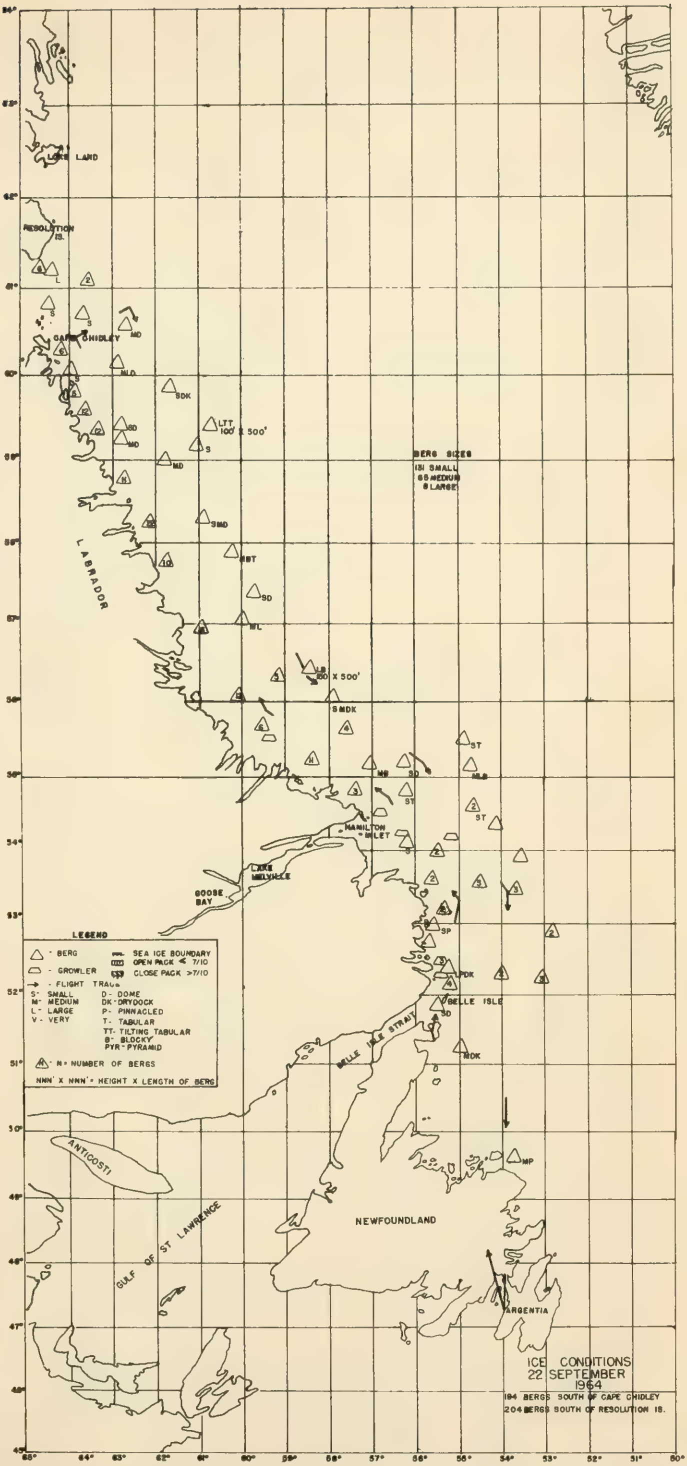

FIGURE 30.—Ice conditions Newfoundland to Labrador, 22 September 1964.

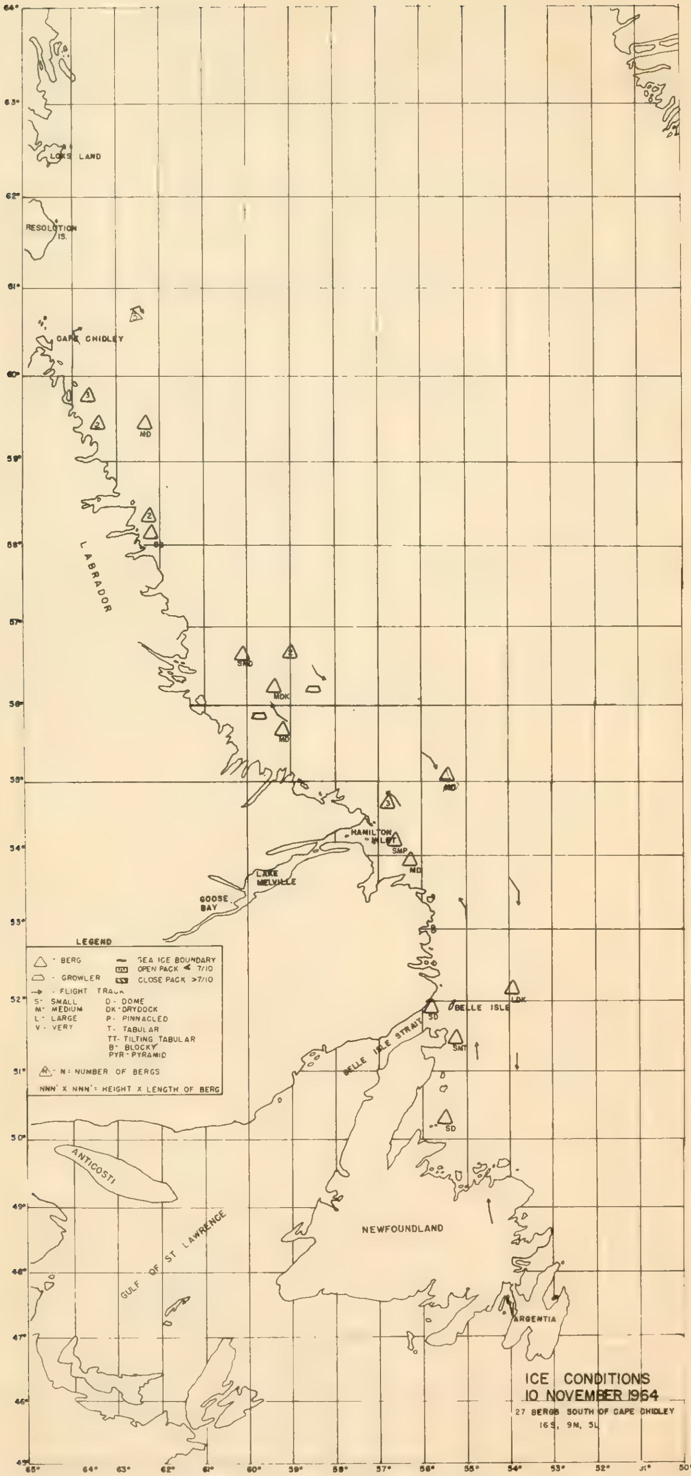

FIGURE 31.—Ice conditions Newfoundland to Labrador, 10 November 1964.

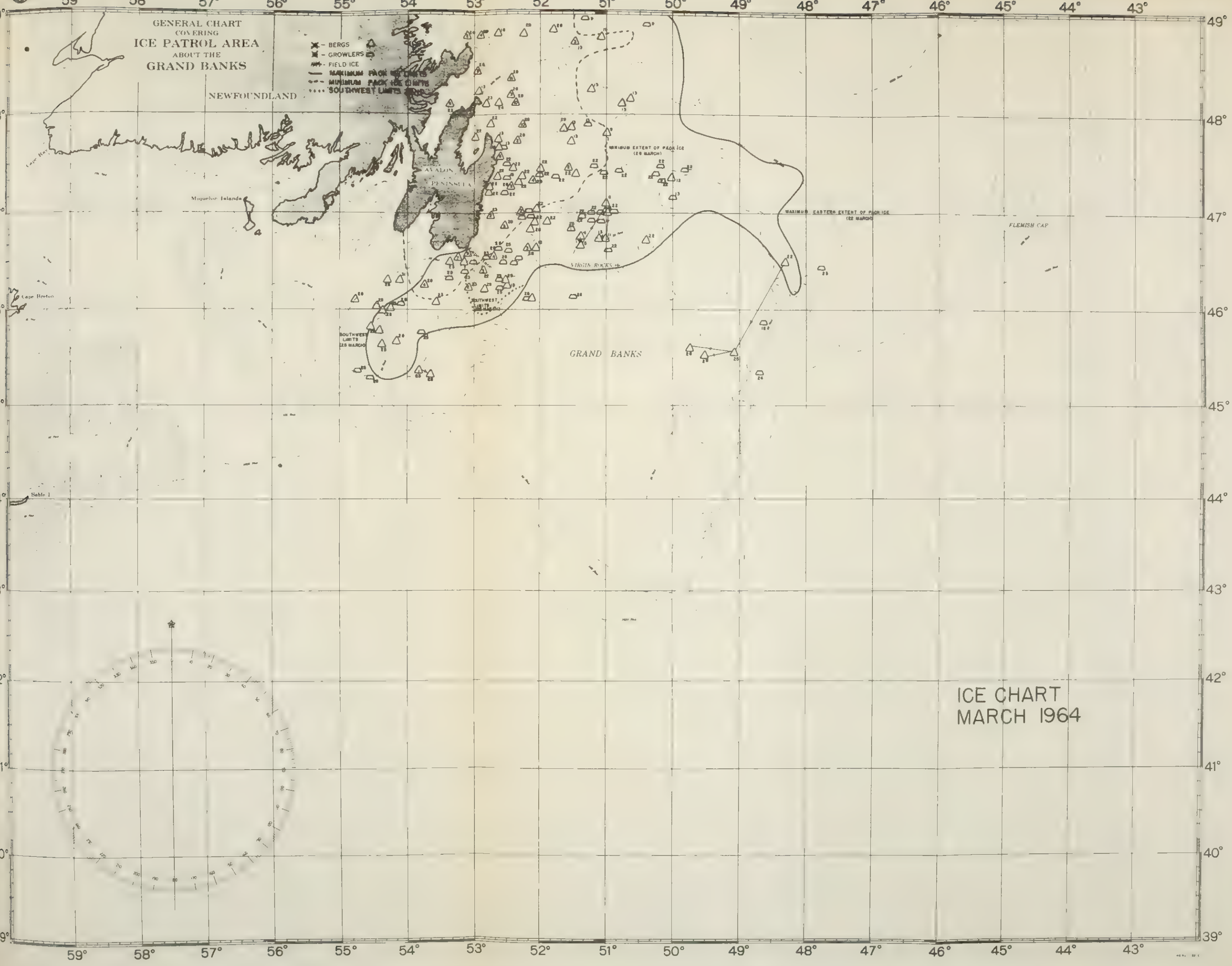

FIGURE 32.—Ice chart Grand Banks, March 1964.

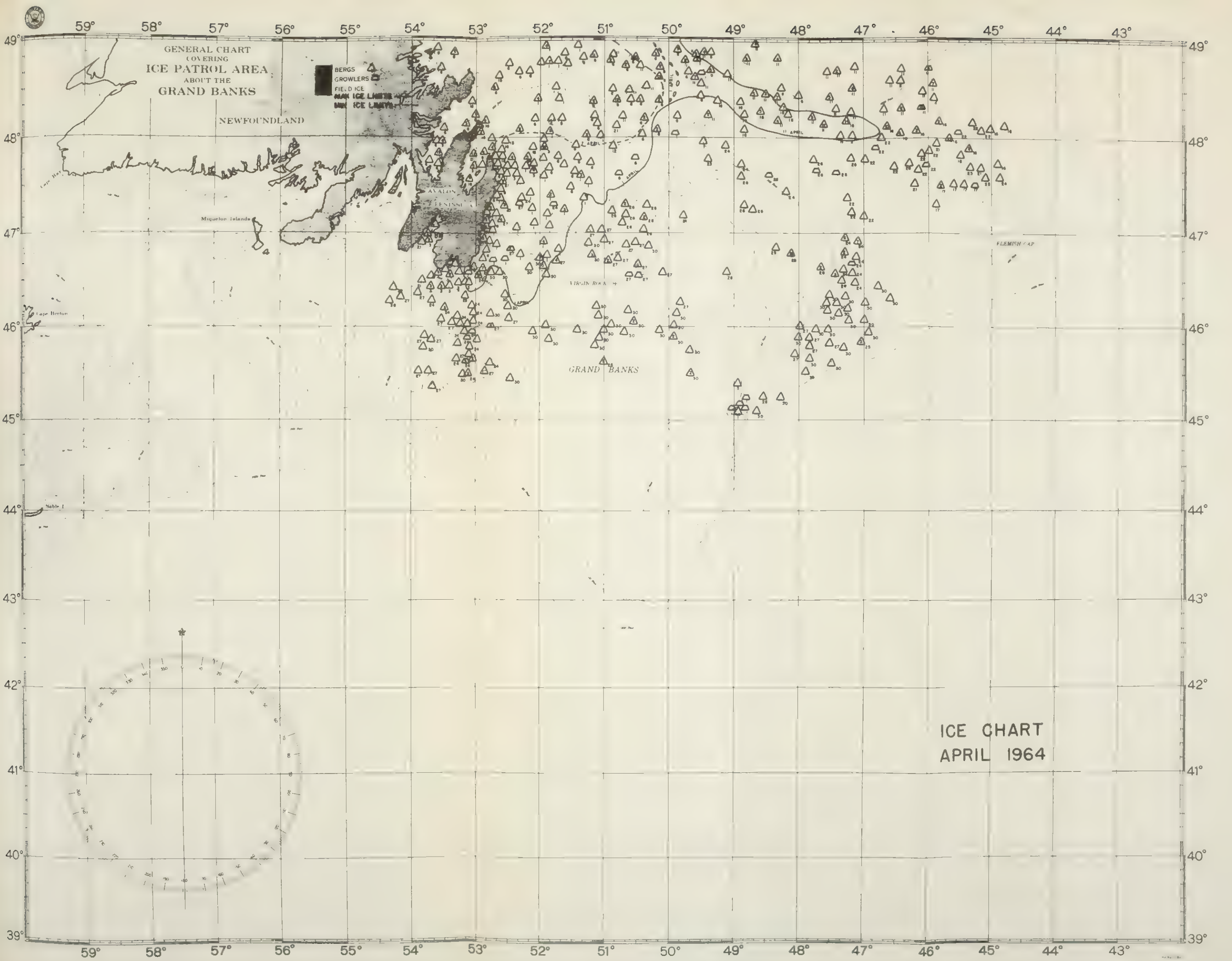

FIGURE 33.—Ice chart Grand Banks, April 1964.

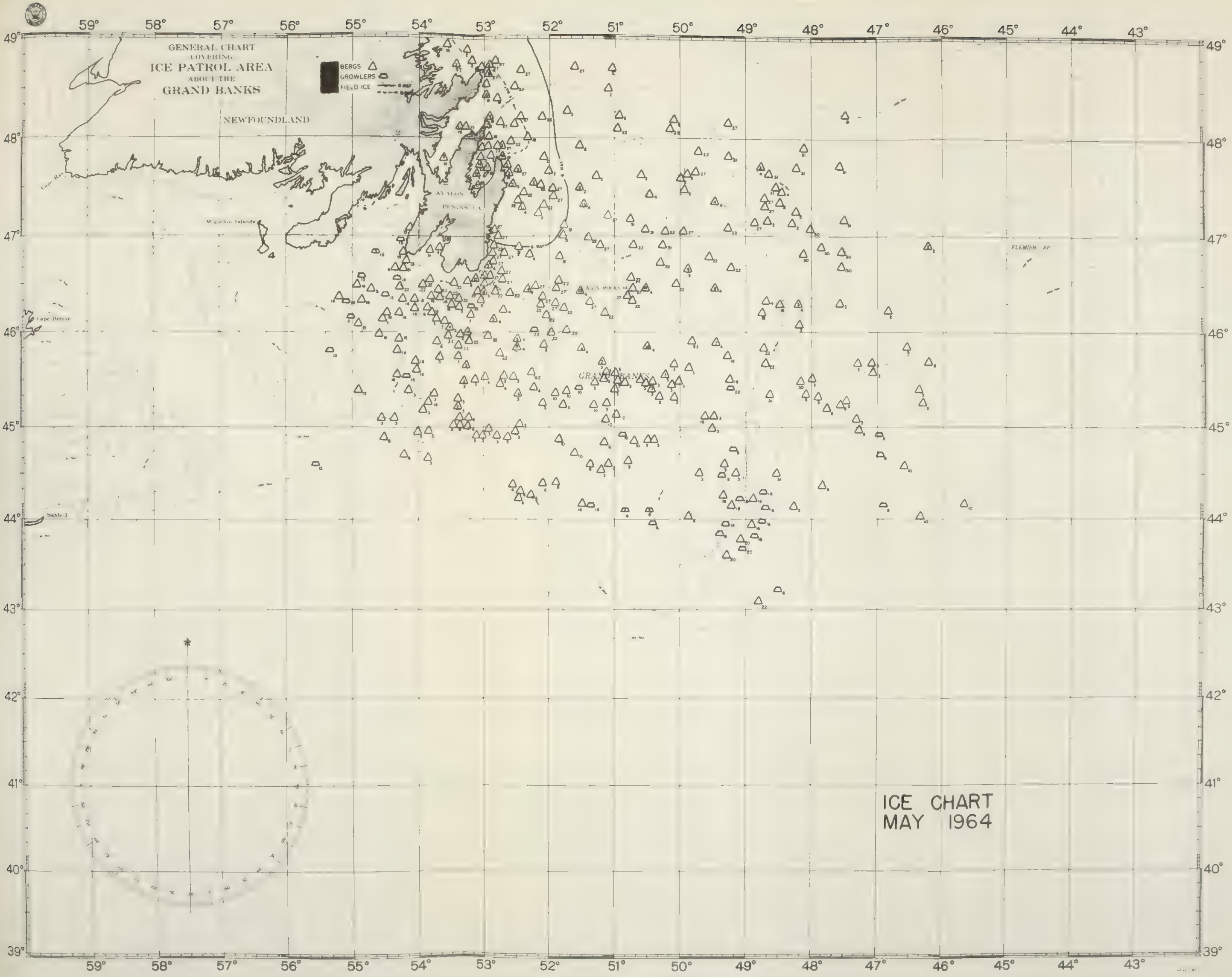

FIGURE 34.—Ice chart Grand Banks, May 1964.

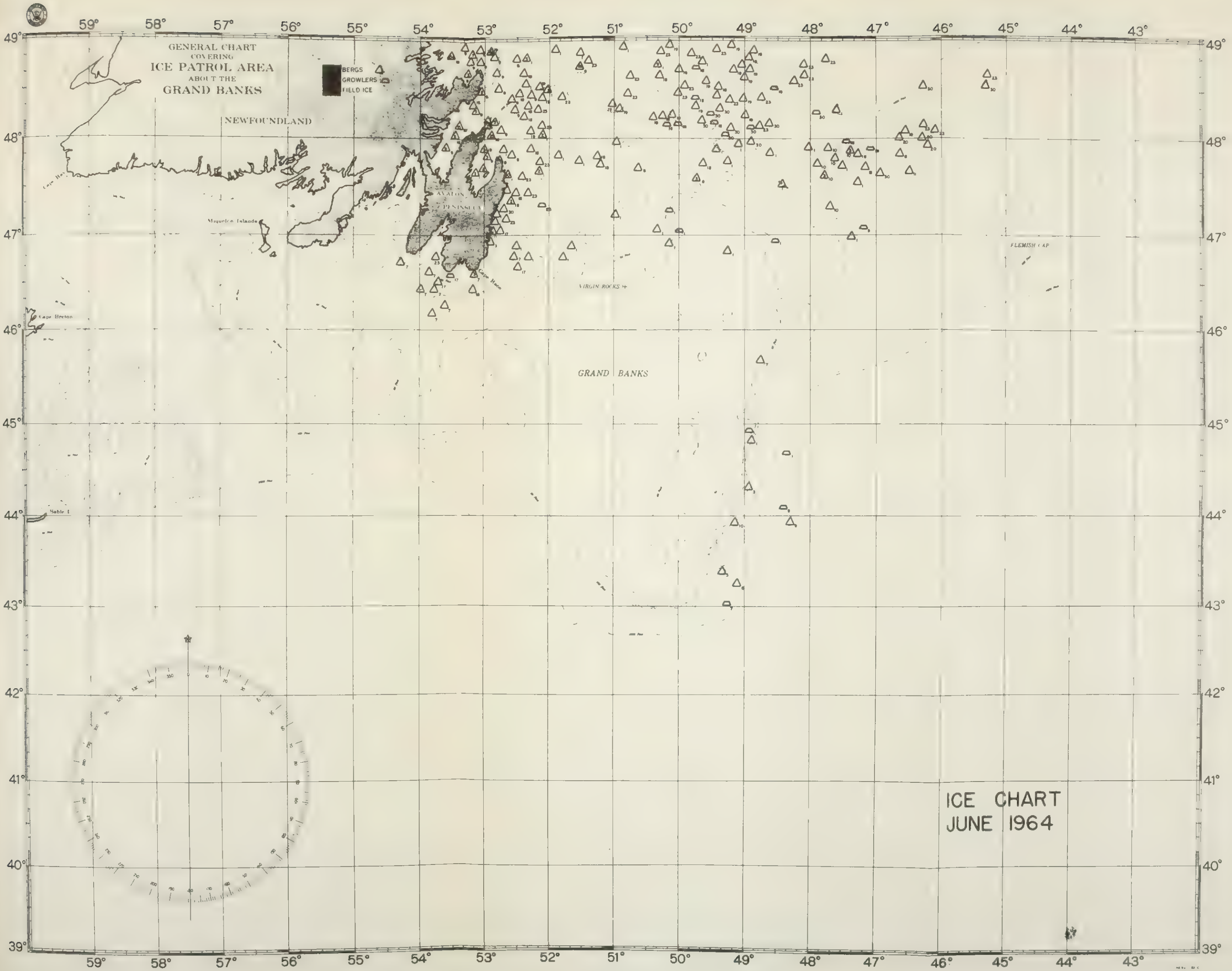

Figure 35.—Ice chart Grand Banks, June 1964.

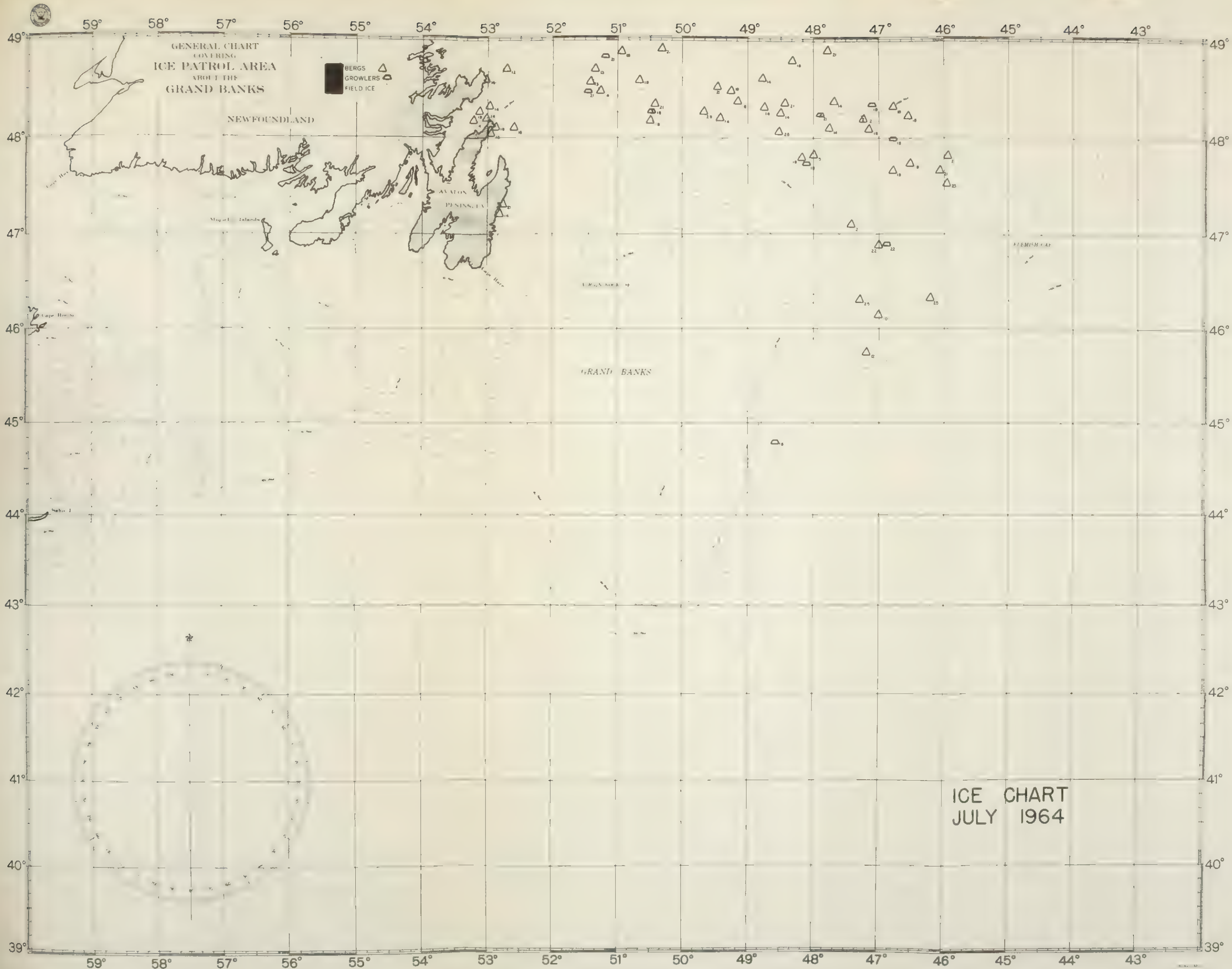

Figure 36.—Ice chart Grand Banks, July 1964.

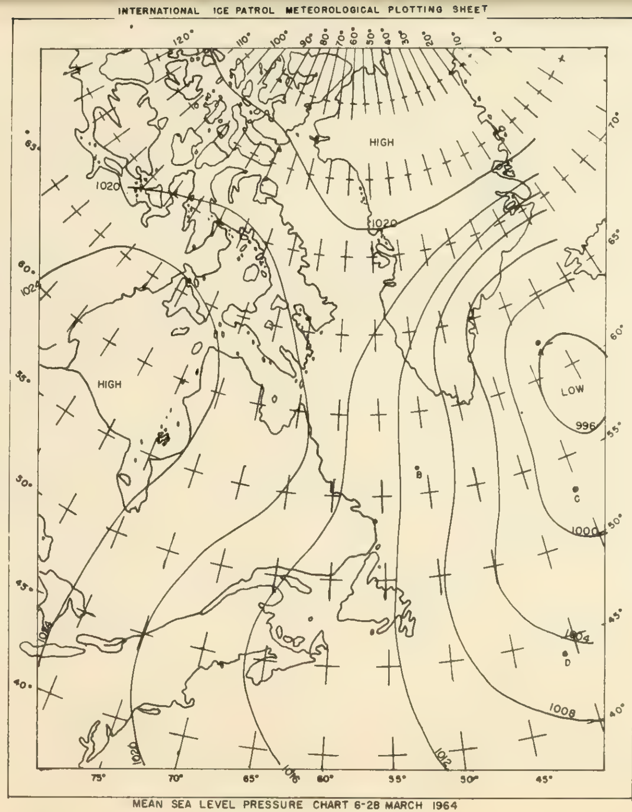

FIGURE 37.—Mean sea level pressure, 6–28 March 1964.

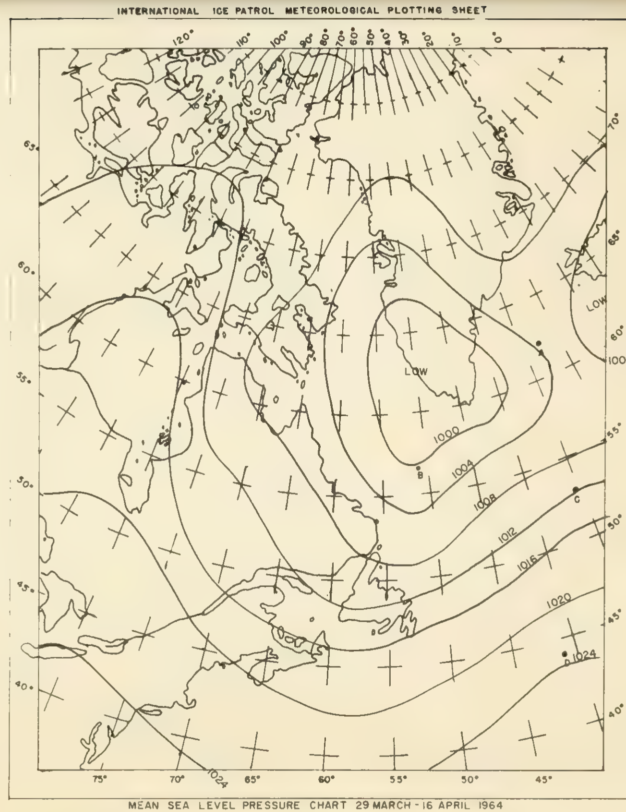

FIGURE 38.—Mean sea level pressure, 29 March–16 April 1964.

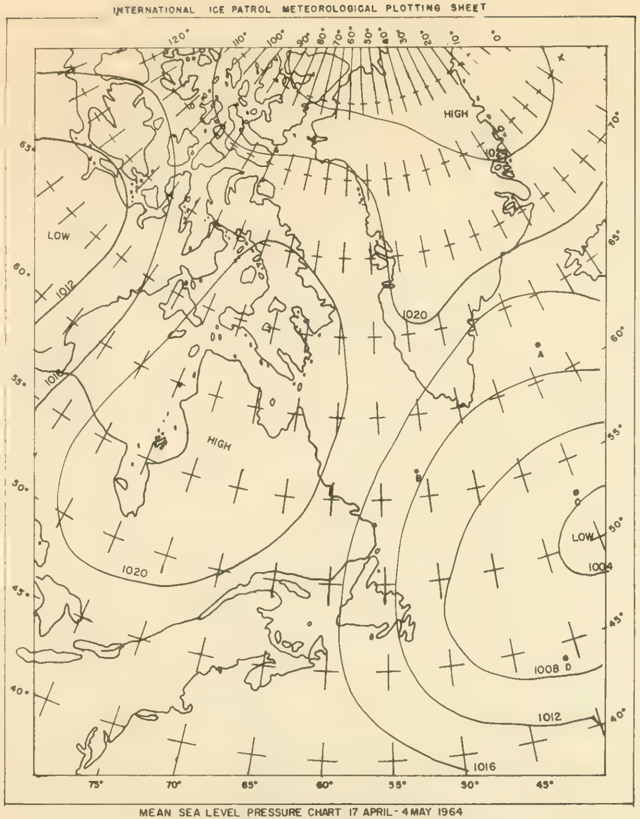

FIGURE 39.—Mean sea level, 17 April–4 May 1964.

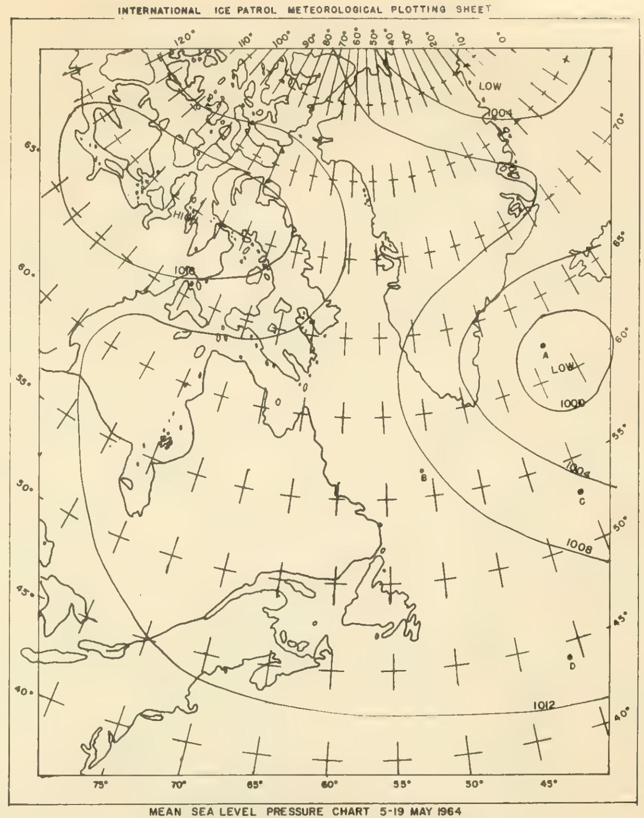

FIGURE 40.—Mean sea level pressure, 5–19 May 1964.

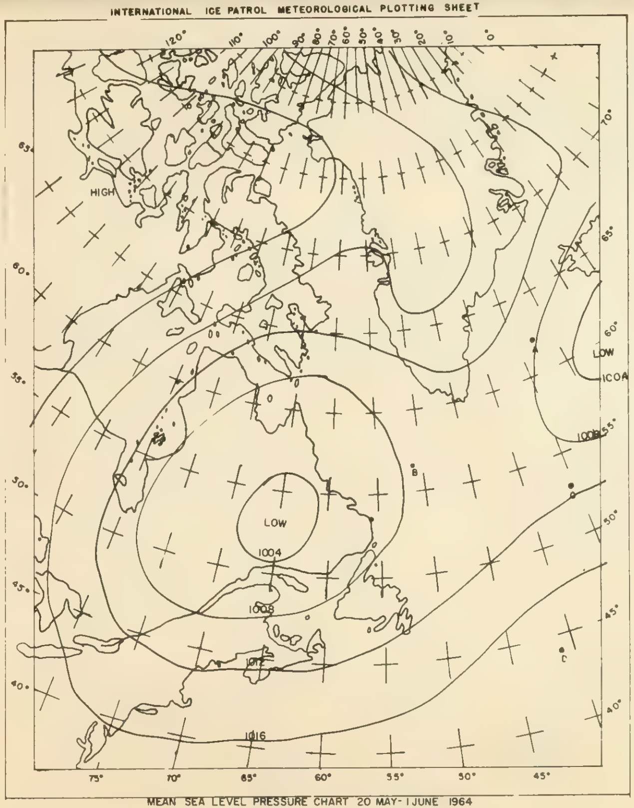

FIGURE 41.—Mean sea level pressure, 20 May–1 June 1964.

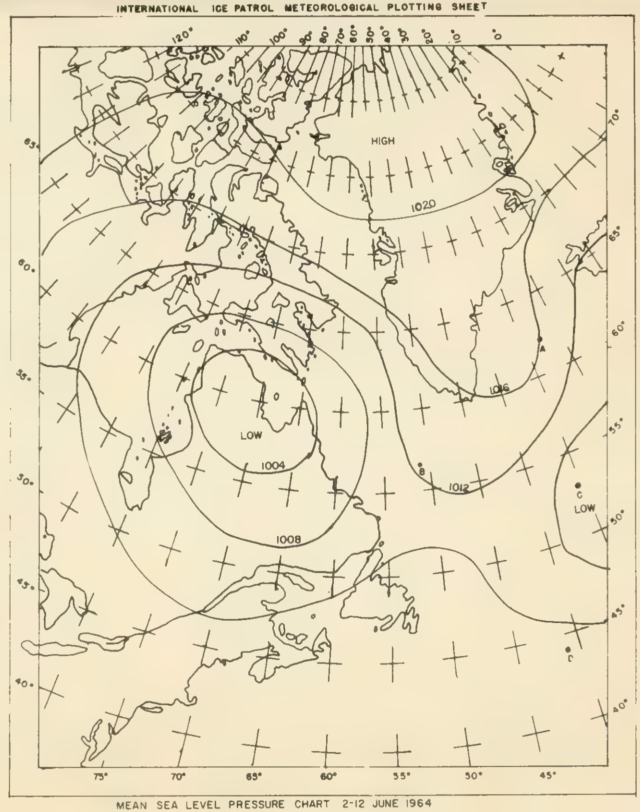

FIGURE 42.—Mean sea level pressure, 2–12 June 1964.

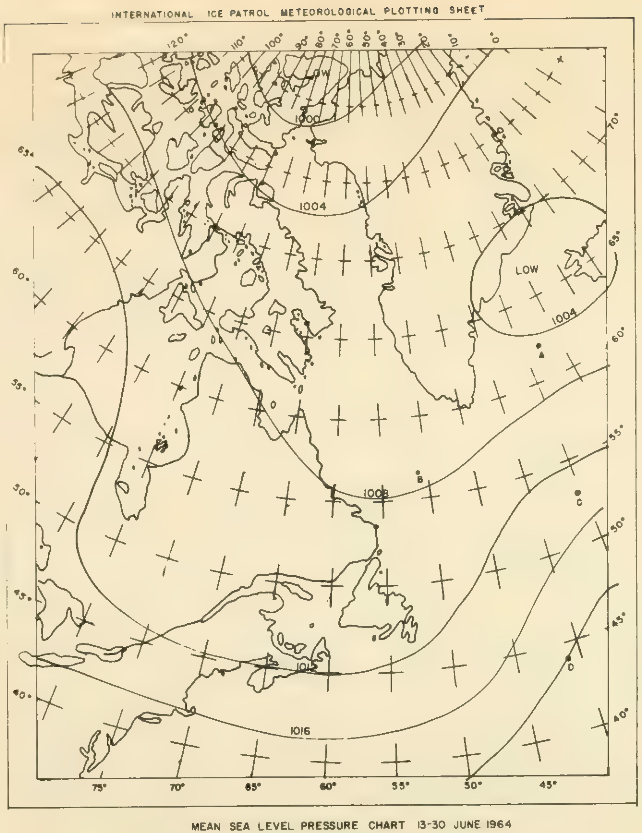

FIGURE 43.—Mean sea level pressure, 13–30 June 1964.

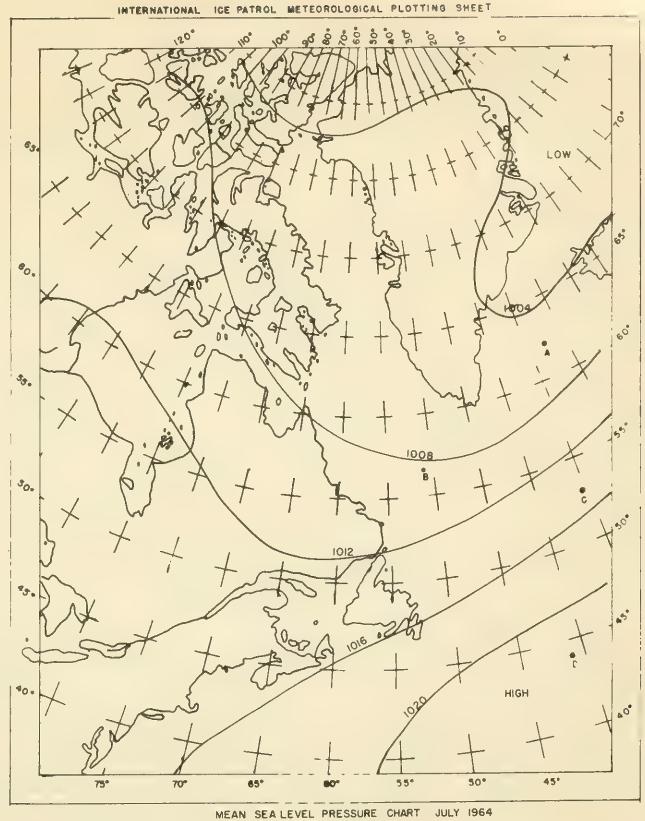

FIGURE 44.—Mean sea level pressure, 1–31 July 1964.

OCTOBER

About seven bergs were estimated to drift south of Belle Isle during October, the southernmost bergs reaching a position of 49°25′ N., 52° W. near Funk Island by the end of October. The latter berg had drifted at an average rate of 6 miles per day from 22 September to 30 October. The northern ice survey of 22–23 October included the northeast coast of Newfoundland and the east coast of Labrador. See figure 64. It is noted that the number of bergs south of Cape Chidley decreased from 194 on 22 September to 89 on 21 October, as deterioration heavily exceeded the resupply. Only three of the bergs sighted 21 October were considered large enough and in position to survive to Belle Isle. During the period 22 September–21 October berg groups drifted at an average rate of 7 miles per day under winds estimated as neutral for berg drift toward the Grand Banks.

NOVEMBER

At the start of November 3 bergs remained south of Belle Isle, the southernmost 50 miles northwest of the Grand Banks. A search on 7 November failed to locate this berg and it was concluded that the berg had deteriorated. The third in a series of flights to determine monthly Newfoundland and Labrador east coast ice conditions was made on 10 November. See figure 31. Only 27 bergs were counted south of Cape Chidley comparing with 89 on 21 October and 194 on 22 September. The Labrador climate from September to November was about normal. The survey results definitely indicated, as had been assumed, that deterioration of bergs along the Labrador east coast normally exceeds the resupply from the north in the autumn, with a minimum of bergs there sometime in November. Deviations can be expected if abnormal weather conditions occur. For example, an abnormally cold September and October with early formation of pack ice in northern Labrador may result in a minimum of bergs along Labrador in late October. On the other hand if the autumn Labrador climate were abnormally warm, delaying the arrival and formation of pack ice, early December might be the time of minimum bergs.

By the end of November, three bergs remained south of Belle Isle. The southernmost berg was about 50 miles north of the Grand Banks and 100 miles from Track F. Only a couple of the bergs sighted on the 10 November survey were expected to be able to survive to the Grand Banks providing the pack ice overtook them soon enough.

DECEMBER

Of the three bergs estimated south of Belle Isle in early December, two survived to the end of the month. These two bergs were both

aground north of the 50° N. near the coast. The 6–8 December northern survey included the east coasts of northern Newfoundland and Labrador. See figure 65. The pack ice extended to a southern limit near Cape Chidley on 6 December, although there were sporadic formations of slush ice close along the coast south from Cape Chidley to South Wolf Island. The number of bergs south of Cape Chidley increased from 27 on 1 November to 41 on 6 December, but deterioration nevertheless had continued.

NORMAL ISOTHERM CHARTS FOR THE GRAND BANKS AND VICINITY

Several factors are involved in the relative severity or lightness of the Grand Banks iceberg season. There can be little disagreement that the key element is the available supply of bergs favorably located upstream of the Grand Banks in the Labrador Current just prior to the ice season. Once the available berg supply has been established, the environment into which icebergs drift as they reach the Grand Banks becomes a most important factor. What happens to the berg supply, where it goes, and how long it lasts depend directly on its environment including the water circulation, wind direction and force, sea ice conditions, water temperature, and bottom topography. The existing environment on the Grand Banks and vicinity is influenced or patterned to a large degree by the recent and existing climate in the area. The winter climate in Baffin Bay, Davis Strait, and the Labrador east coast, as it affects the strength of the Labrador Current and the heat transported by it in the spring months to the Grand Banks, is undoubtedly an important factor. The volume, heat transport, and strength, of the Gulf Stream near the Grand Banks is another element that plays an important part in determining the overall berg environment on the Grand Banks and vicinity.

The environment on the Grand Banks and vicinity can be reasonably determined. Meteorological conditions including air temperatures and wind speed and direction over the Grand Banks are continually monitored. The wind is an important force in moving ice directly by acting on the exposed portion of the berg and indirectly by setting up wind current and thus contributing to the water circulation. Wind is also important as a destructive force by setting up wind waves which are erosive to ice. During the ice season, oceanographic surveys are conducted in key areas by the oceanographic vessel. Water circulation at the surface due to geostrophic current is determined and water temperatures are taken at the surface and to depths approaching the bottom. Numerous sea surface temperatures and weather reports are received from shipping and plotted during the ice season; thus, enabling the construction of a bimonthly isotherm chart covering the entire area of responsibility.

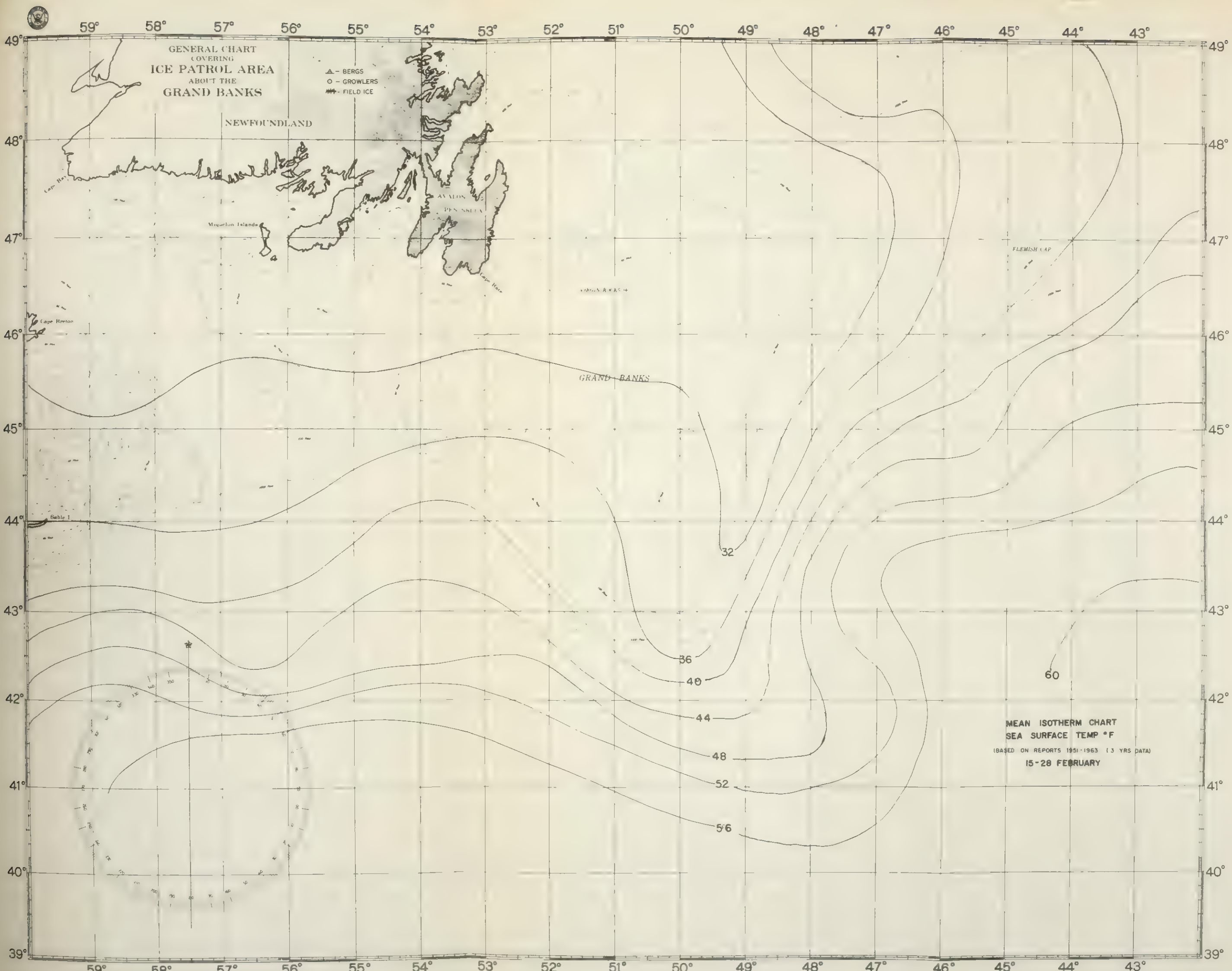

Figure 45.—Normal sea surface isotherms, 16–28 February 1964.

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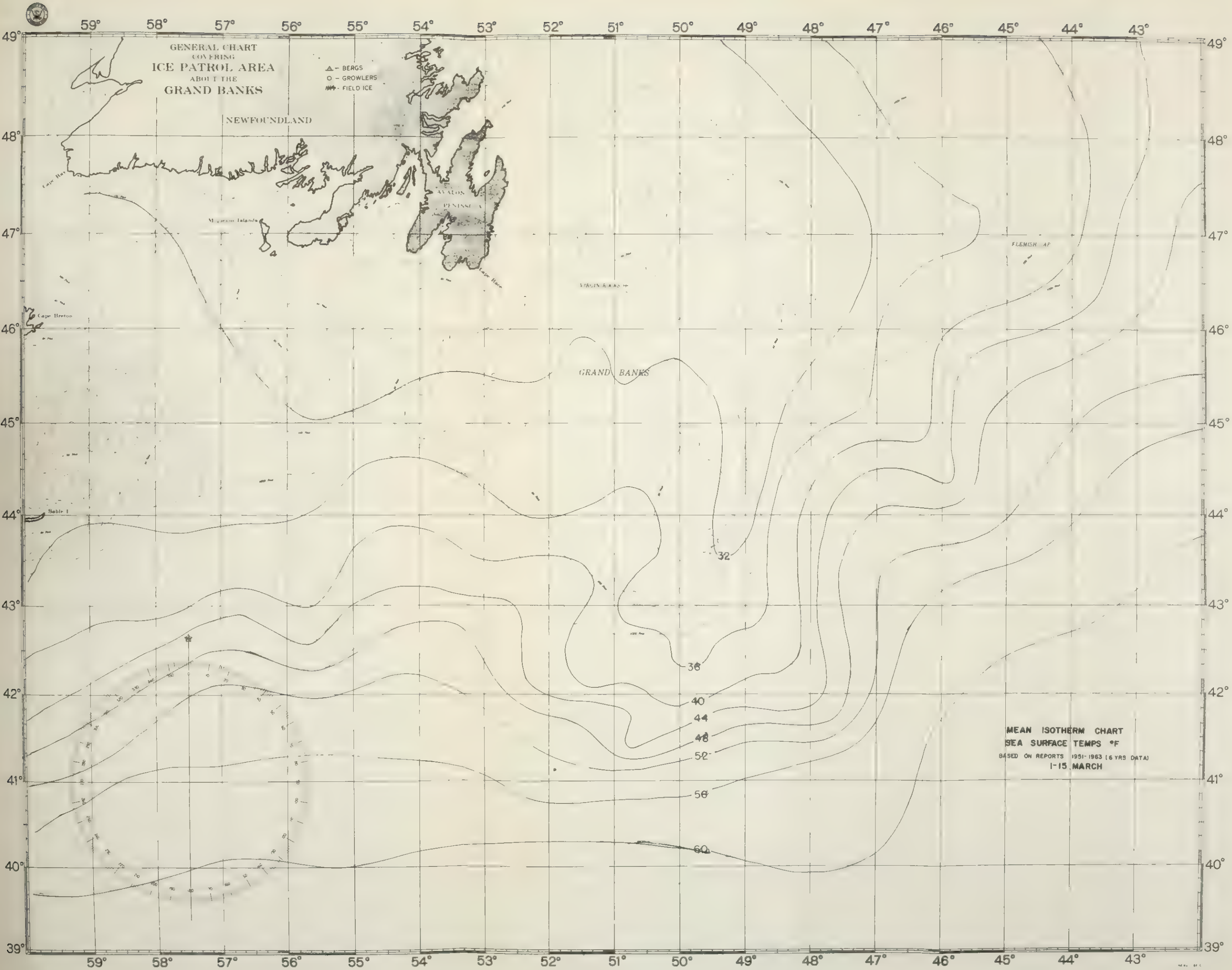

FIGURE 46.—Normal sea surface isotherms, 1–15 March 1964.

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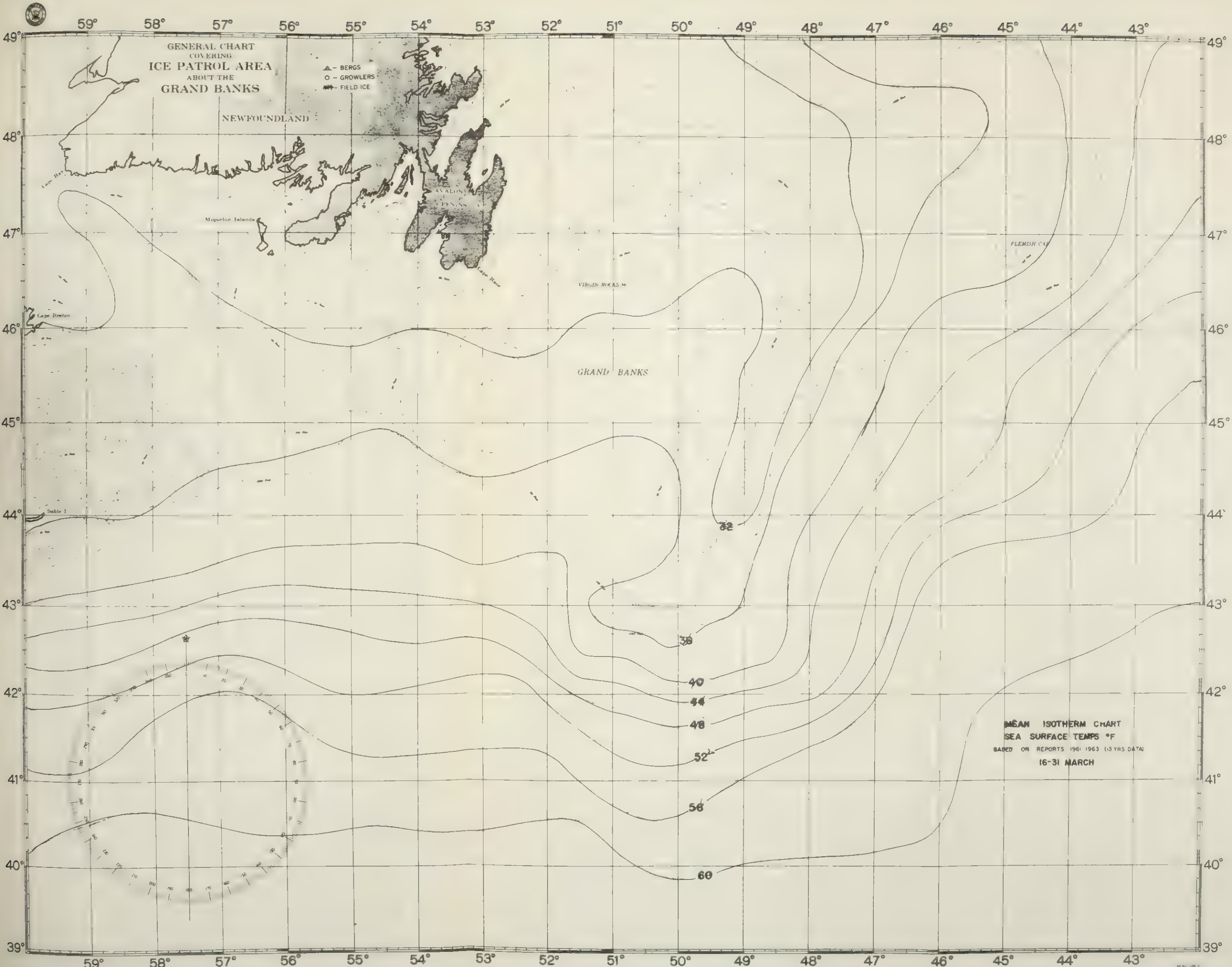

Figure 47.—Normal sea surface isotherms, 16–31 March 1964.

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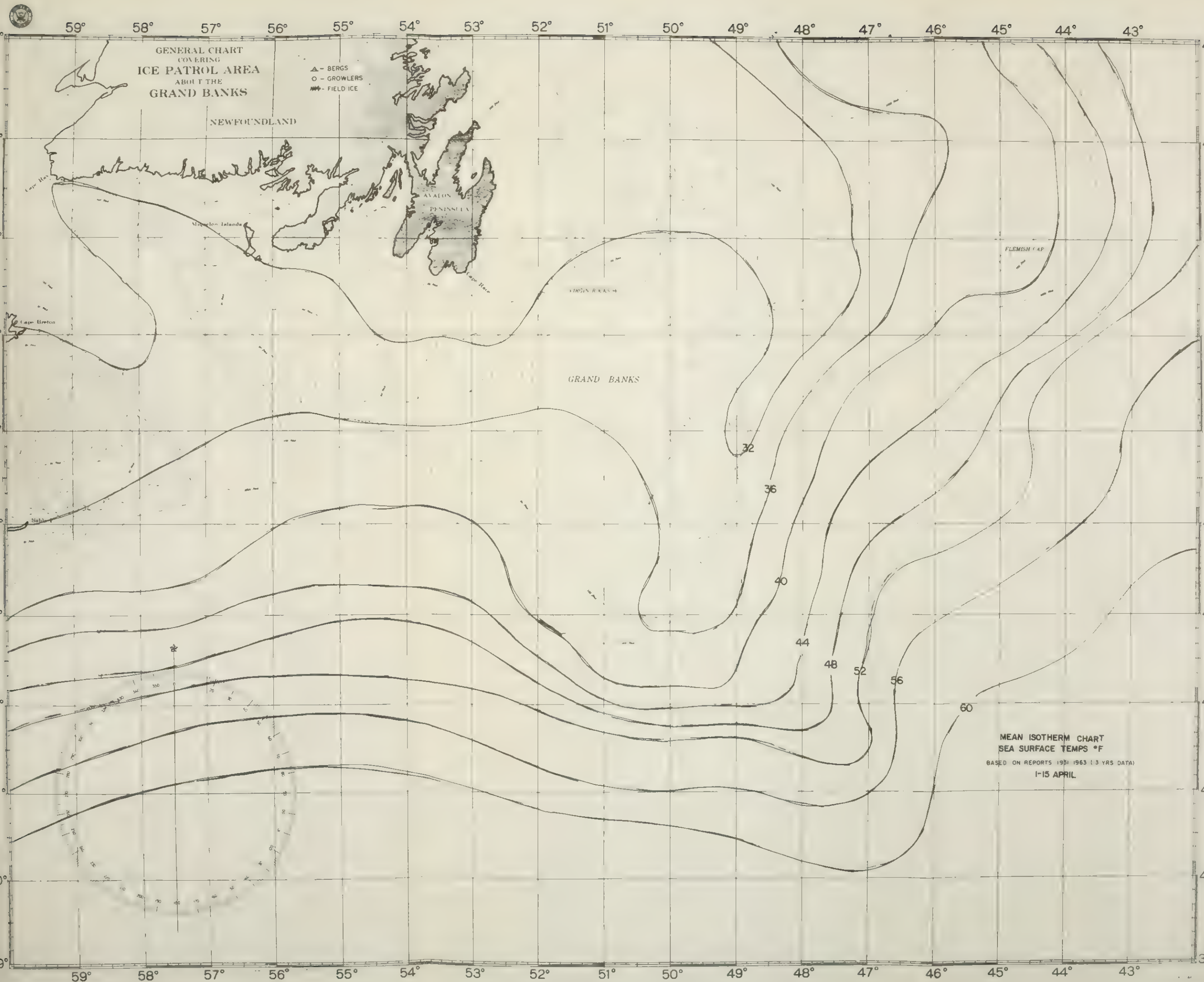

FIGURE 48.—Normal sea surface isotherms, 1–15 April 1964.

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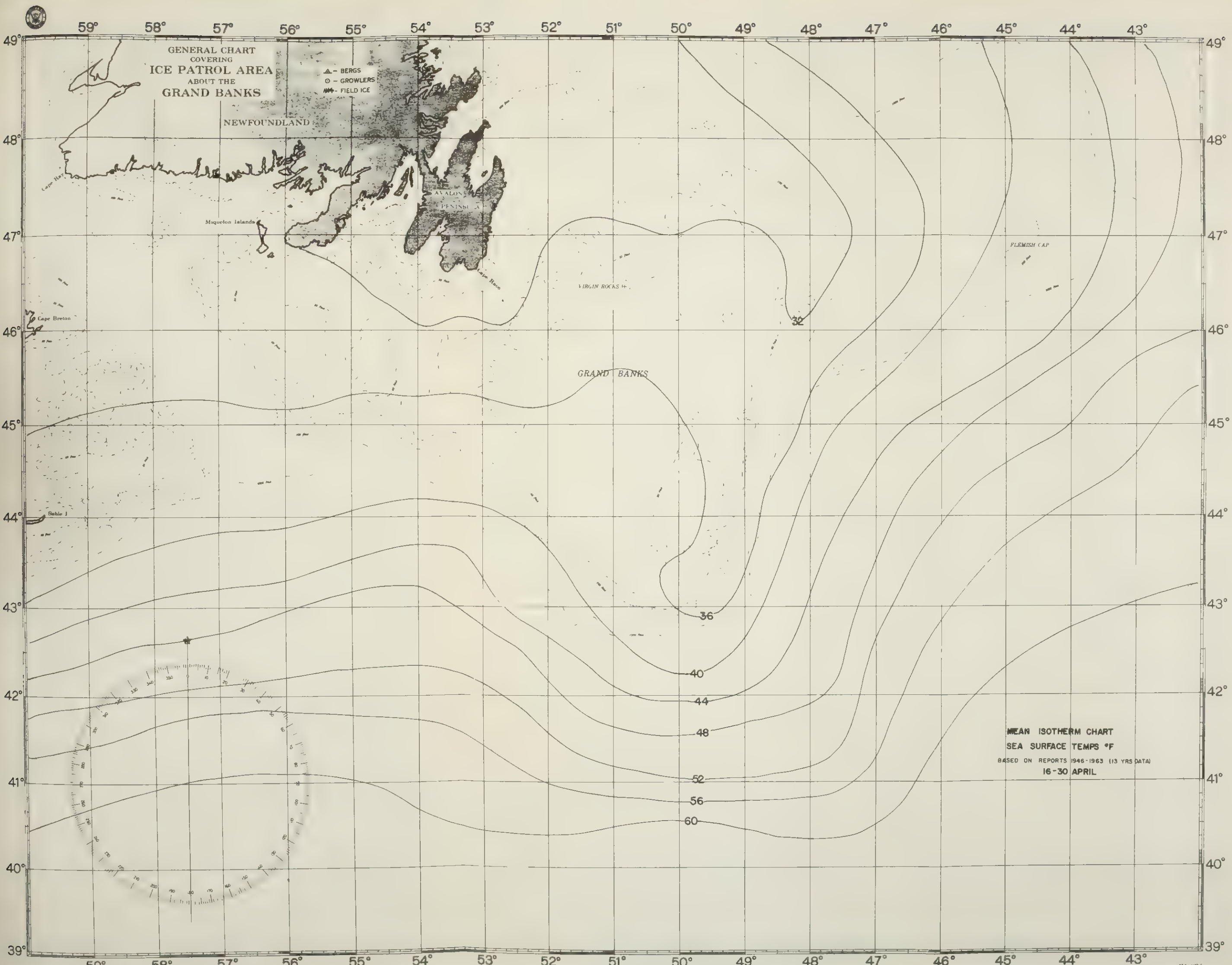

Figure 49.—Normal sea surface isotherms, 16–30 April 1964.

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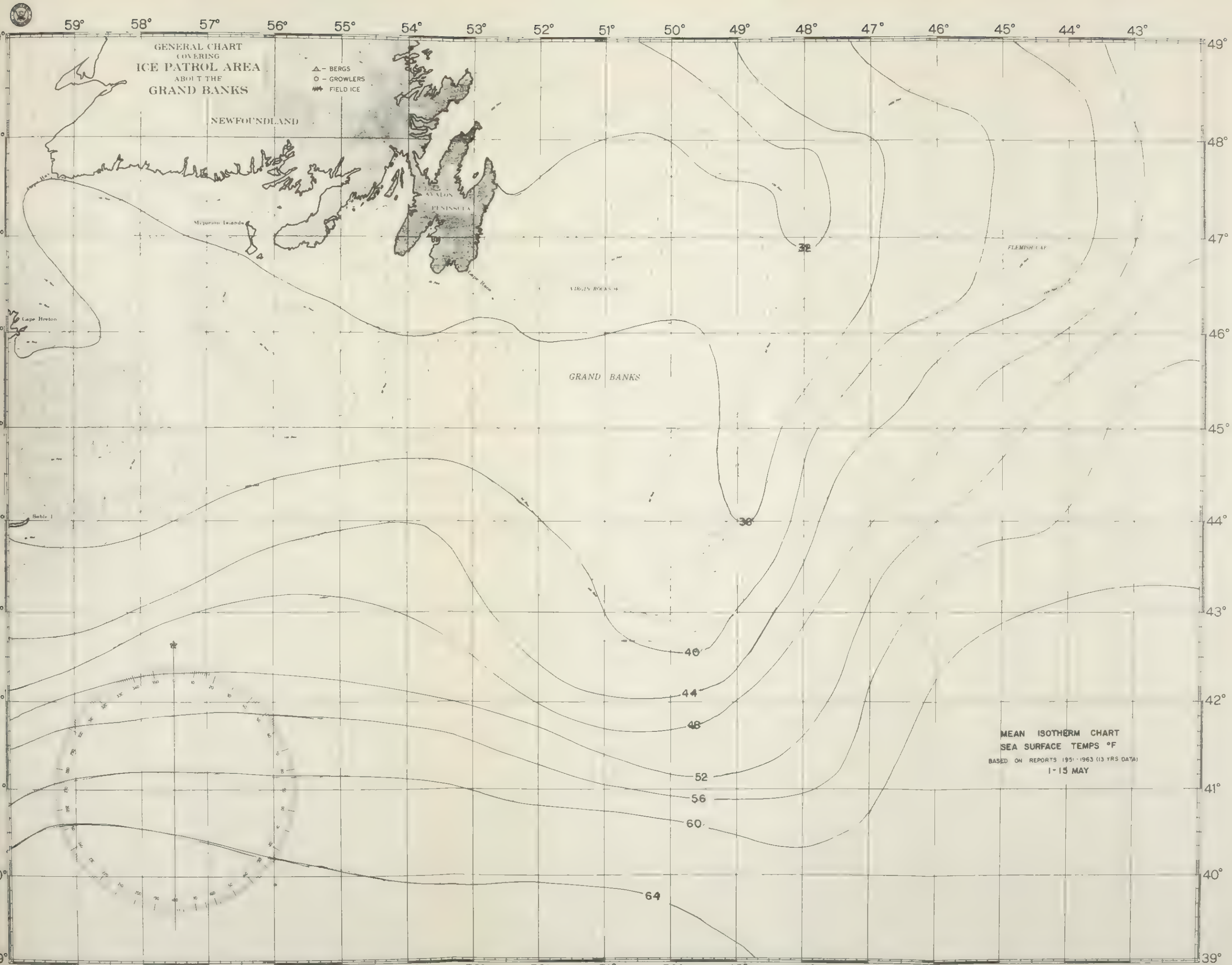

FIGURE 50.—Normal sea surface isotherms, 1–15 May 1964.

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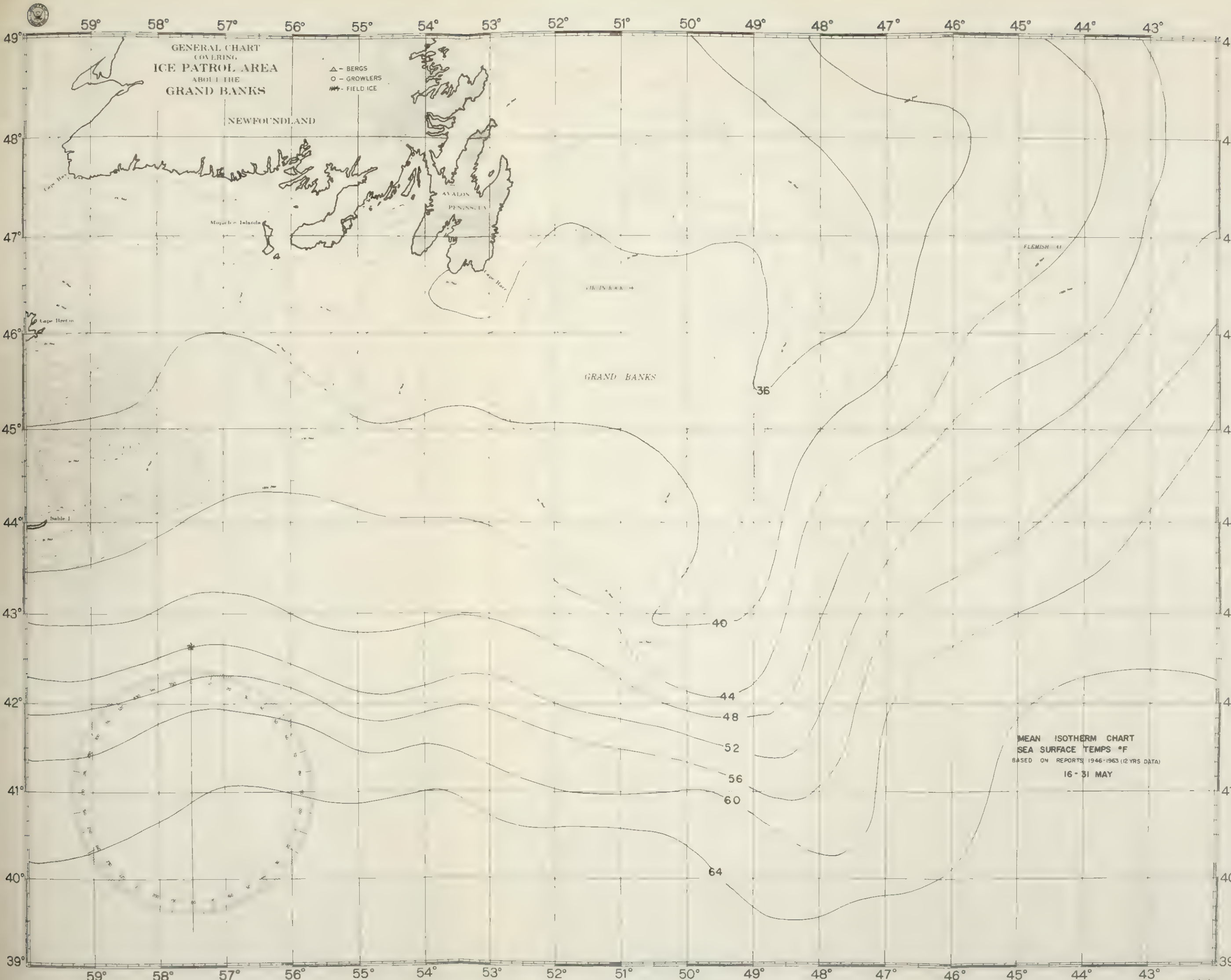

FIGURE 51.—Normal sea surface isotherms, 16–31 May 1964.

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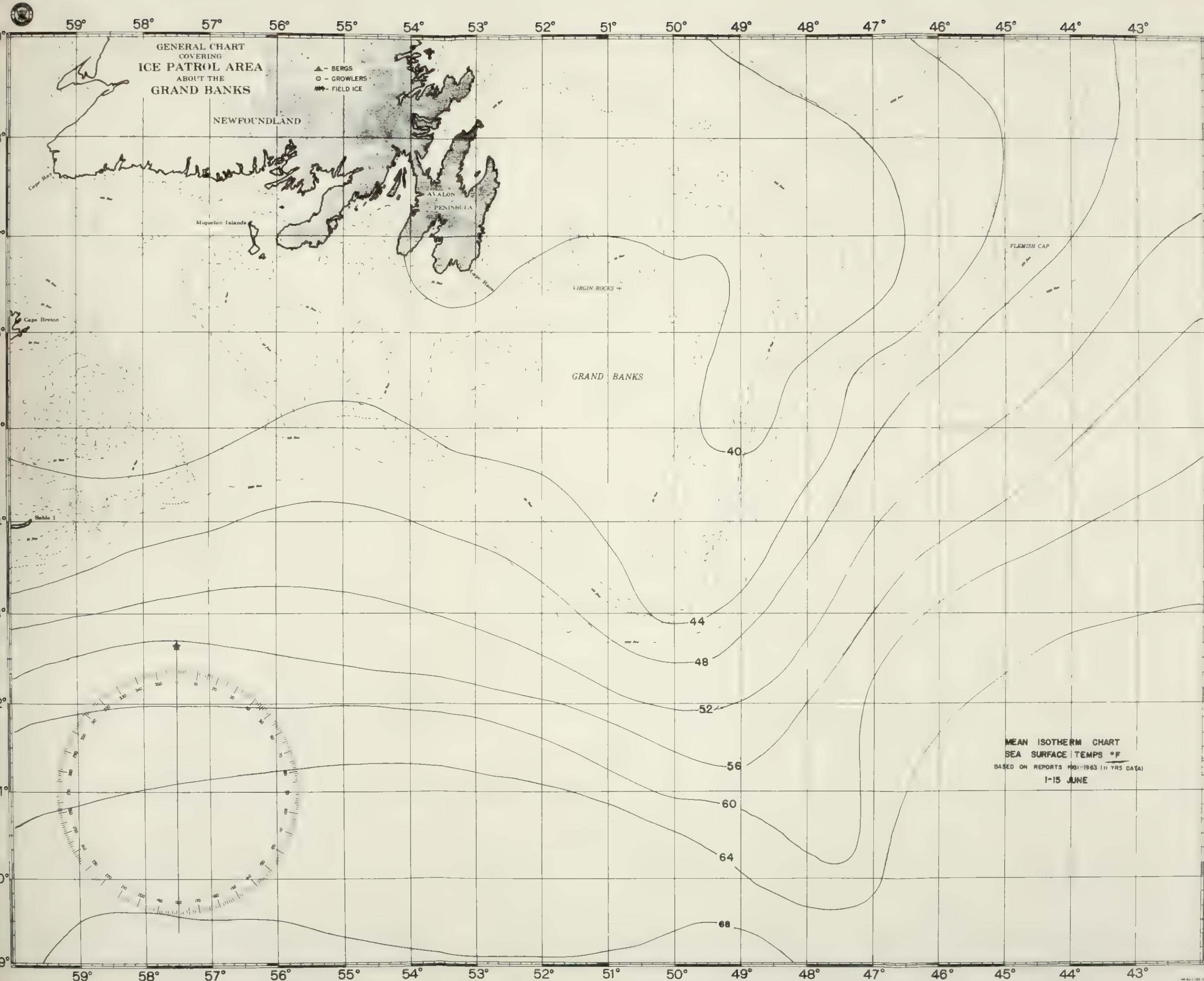

FIGURE 52.—Normal sea surface isotherms, 1–15 June 1964.

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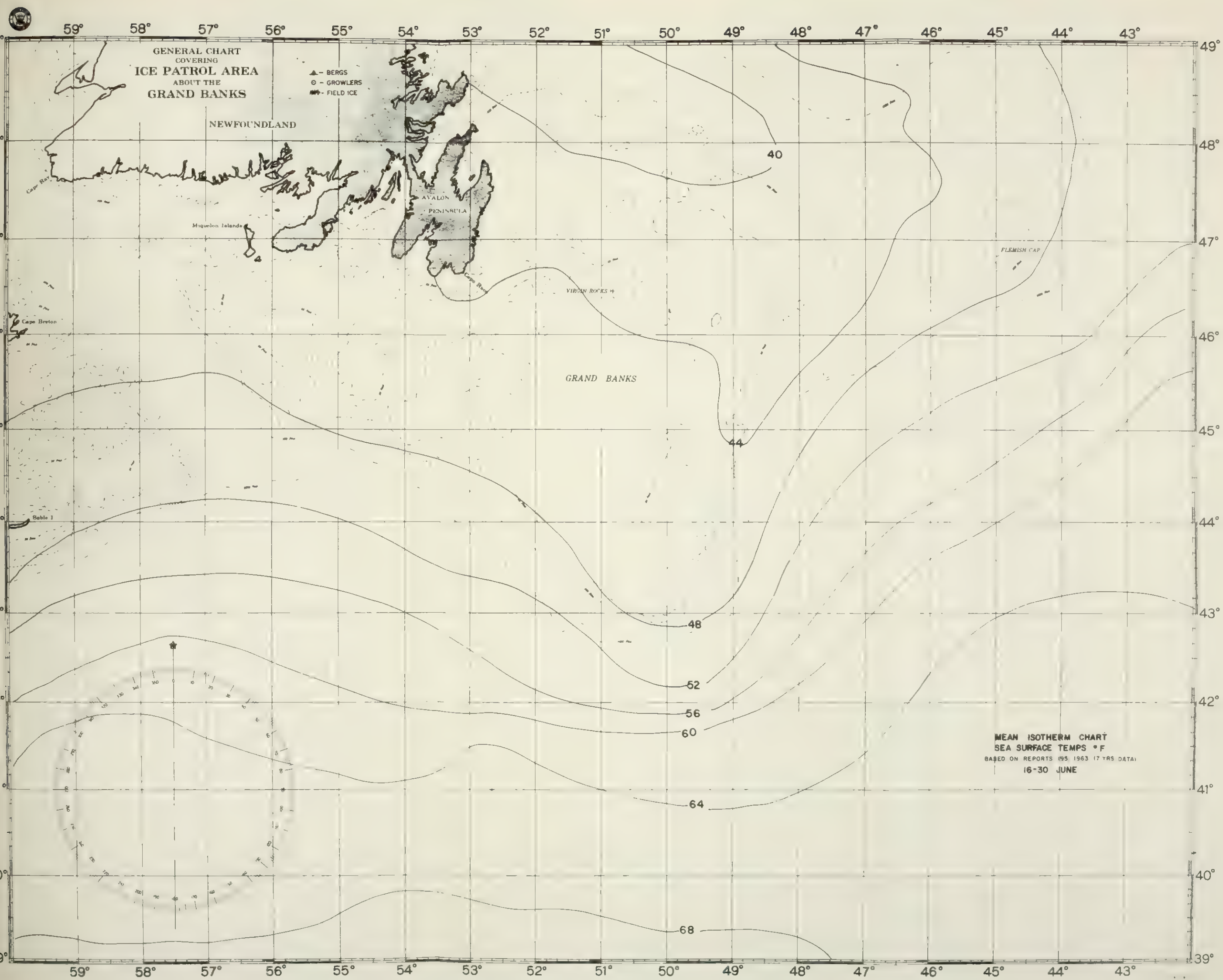

FIGURE 53.—Normal sea surface isotherms, 16–30 June 1964.

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The relative importance of sea conditions (state of the sea) versus water temperature on the deterioration of an iceberg can only be assumed until more studies are made. The sea state is important to the erosion of the berg, especially near the water line, and in setting up stresses and strains to cause calving of pieces or even breaking-up of the berg. The deterioration of ice due to the water temperature is more subtle. The rate of melting of the ice at its underwater surface depends directly on the sea temperature. Differences in air and sea temperatures are probably important in setting up stresses within the berg. Both factors are mutually dependent in their overall affect on berg deterioration. The roughness of sea conditions increases the melting effect by assisting in the exchange of water around the berg. The ice-water temperature differential assists the sea state in calving or breaking-up of bergs by setting up stresses within it. There is no doubt that a given berg will survive much longer in calm than in rough seas at a given water temperature. Also the same berg will survive much longer under given sea conditions at lower sea temperatures. Ordinarily the average sea conditions on the Grand Banks for a given calendar period do not vary much from year to year. At least it is believed that the effect on deterioration of ice from sea conditions is subject to less variation for given calendar periods than from variations in sea temperatures. Thus it is assumed that the sea water temperature, as represented by the bimonthly isotherm chart, is a more important and more useful consideration. To say the least, the bimonthly isotherm chart is a useful tool in assessing the ice environment and forecasting ice deterioration.

The International Ice Patrol has recognized the importance of sea water temperatures on the deterioration of ice ever since its inception in 1913. Surface temperatures recorded by Ice Patrol vessels and reporting ships have been plotted over the years. Isotherm charts have been constructed for the periods of the patrols since 1919. Since 1951 isotherm charts based on numerous reported sea temperatures have been drawn on a bimonthly basis during the ice season. Normal bimonthly isotherm charts have been constructed for the interval 1951–63 during the Grand Banks ice season from mid-February through June. See figures 45–53. While the bimonthly normals for the periods from mid-March through May can be considered true normals, the others, especially the 15–28 February chart, should not be considered true normals. The Ice Patrol is not usually commenced until early March unless abnormally bad ice conditions require an earlier start. Thus the 15–28 February chart, which is based on only 3 years data, is more indicative of a 15–28 February environment during heavy ice seasons and/or early ice seasons. The 1–15 March chart is based on 6 years' data and somewhat more representative of normal conditions, although it is pointed out that this chart probably

indicates a colder environment than is really normal. As the missing years all had relatively late starting and light ice seasons, it is presumed that the March sea temperatures were warmer than normal these years and not reflected in the normal chart of 1–15 March presented here. The charts for the 16–31 March, 1–15 April, 16–30 April, and 1–15 May periods are based on data from each of the 13 years from 1951–63 and can be considered true normals for those years. The 16–31 May chart and the 1–15 June charts, based on 12 and 11 years data respectively out of 13 years cannot be considered true normals, as the missing years were light with presumably abnormal warm environments. The 16–30 June chart, which is based on only 7 years' data, is probably more representative of abnormally cold temperatures, as the available data were for the latest and heaviest 7 ice seasons of the 13 years. A July chart was not constructed as July data were available for only 2 years, 1957 and 1959, both abnormally cold years accompanied by very heavy and late ice seasons.

Two methods were used in the construction of the normal charts. First, the average temperature was determined for each 1° quadrangle for each bimonthly period, and the constant temperature lines were drawn up accordingly. While it was expected that this method would suffice for most of the area of responsibility (39° N., 49° N. and 42° W., 60° W.) it was suspected that the method might not be sufficiently discriminating along the east slope of the Grand Banks and at the Tail of the Banks especially in the early Spring. The reason for this suspicion was the fact that the Labrador main stream is quite narrow along the east slope and at the Tail, narrowing in places to less than 25 miles in width especially near 45° N. Additionally, the Labrador Current is well defined at the surface during the first half of the ice season. As considerable warming of surface waters takes place beginning in May, the Labrador Current becomes less obvious from surface temperatures. Therefore the graphical method was also used to more accurately construct the normal isopleth for each normal chart. For example, each available 32° F. isopleth for a given calendar period was traced and the normal 32° F. isopleth was then graphically determined. The same was done for the 36° F. isopleth and the others. It was discovered that the method of construction of normal isopleths by using average temperatures in the 1° of latitude and longitude quadrangle did indeed fall down in the areas suspected. In other areas both methods correlated very well. The resultant normal charts presented are based on a combination of both methods and are reasonably accurate if the limitations previously discussed are taken into account.

An analysis of the normal charts constructed yields the following conclusions:

1. The coldest surface environment on the Grand Banks occurs during the last half of March. A comparison of the 15–28 February,

1–15 March, and 16–31 March charts indicates a remarkable similarity. However, when it is considered that the 15–28 February and the 1–15 March charts are more representative of abnormally cold years and that the 16–31 March includes the warm years, it is easy to reach the above conclusion.

2. A warming trend is barely detectable in the 1–15 April chart. Overall on the Grand Banks and vicinity, the sea surface temperatures have risen about 1° F. However there is no noticeable warming on the eastern slope of the Grand Banks north of 46° N., or on the northern Grand Banks north of 47° N., between 45° W., and the coast. It should be pointed out that these are key locations for bergs likely to reach the major shipping lanes at the Tail of the Banks. Ice Patrol records show that while most bergs have drifted south of 48° N. during April, May has been the heaviest berg month in the major shipping lanes.

3. A comparison of the 1–15 April and 16–30 April charts shows a very slight warming trend in most areas, except that the critical area at the Tail of the Banks (41° N., 43° N., 49° W., 52° W.) has become colder. The cooling at the Tail can be explained by the greater strength of the Labrador Current just prior to and during this period and the fact that the average temperature of the Labroador Current at this location is probably coldest at this time of the year. While the 32° F. isopleth has retreated 60 miles to the north along the east slope of the Grand Banks, it is approximately in the same location for 16–30 April as 1–15 April on the remainder of the Grand Banks. The 36° F., 40° F. and 44° F. isopleths for the 16–30 April chart are almost identically located as their 1–15 April counterparts.

4. The warming trend becomes more noticeable during 1–15 May. The 32° F. isopleth has retreated an average of 40 miles northward and slightly westward from the 16–30 April normal. The 36° F. isopleth has retreated about 40 miles northward and 10 miles westward on the Grand Banks. All other isopleths have generally retreated somewhat northward and westward. Generally temperatures are 1° F.–2° F. warmer than for the previous period.

5. The 16–31 May normal isotherm chart indicates an acceleration of the warming trend. The 32° F. isopleth has disappeared and there is generally about a 2° F. rise in surface temperature as compared to the 1–15 May chart.

6. The 1–15 June normal shows a 2°–3° F. rise in sea temperatures over the previous period, reflecting a sharp warming trend. The 36° F. isopleth has disappeared. The temperature at the Tail of the Banks has risen from 40° to 44° F.

7. The 16–30 June chart, should not be considered a normal chart as it probably represents colder than normal temperatures. Nevertheless, the strong warming trend is obvious. The 40° F. isopleth has

retreated about 200 miles along the east slope of the Grand Banks and the temperature at the Tail has risen 4° F., from 44° to 48° F.

It is noted that an airborne radiation thermometer was tested by the International Ice Patrol during the past ice season. While the actual water temperatures recorded by this instrument were not considered sufficiently reliable, the instrument was useful in detecting changes in surface water temperature, and therefore in locating the Labrador Current and its branches. The most successful use of this instrument was obtained during an Ice Patrol flight on 22 May. See figure 16. In order to obtain acceptable sea surface temperatures with this instrument, correction factors for moisture content in the air and for sea-air temperature differences must be determined. It must also be understood that the microsurface temperature is being determined and this temperature may vary significantly from the water temperature at a depth of a foot or more. It is expected that the airborne radiation thermometer will eventually serve to abundantly increase our knowledge of berg environment.

The sea surface at the Grand Banks and vicinity is only a small portion of the berg environment there. An isotherm chart including temperatures below the sea surface or the average temperature to a given depth would more completely depict the environment. However, subsurface data are obtainable only from the Ice Patrol Oceanographic Vessel, which conducts oceanographic surveys in the area about half the time during the ice season. This year the International Ice Patrol Office constructed isotherm charts based on average temperatures from the surface to 150 meters for each oceanographic survey from data supplied by the oceanographic vessel. See figures 11–15. The centigrade scale was used, as this scale is becoming universal for recording sea temperatures. There is nevertheless reluctance to convert the bimonthly surface isotherm charts to centigrade as the fahrenheit scale has been used by the Ice Patrol for these charts since their first construction over 40 years ago. It is hoped that average temperature charts, which reflect below-surface temperatures, will be constructed annually and eventually result in normal charts which will be more useful than the normal charts based entirely on surface temperature. In the meantime, the normal surface charts will be useful in determining whether the existing berg environment is normal or abnormal and therefore in forecasting ice conditions. Surface sea temperatures generally reflect subsurface temperatures even in the region of the greatest variety of oceanographic conditions in the world known as the Grand Banks and vicinity.

In order that the isotherm charts can become more useful in forecasting, berg deterioration studies must be accomplished on a scientific basis. Berg observation by Ice Patrol vessels has been abundant in the past, but little scientific data on deterioration has accompanied the

observations. This past season, one berg was traced from a medium dome berg temporarily aground at 47° N., 48°50′ W. on 4 May to a growler near 43°05′ N., 49°15′ W. on 7 June, when it was last sighted. It was estimated to be 135 feet high and 400 feet long on 4 May and survived 34 days in an estimated average temperature of 34.2° F. during the interval. Sea conditions were estimated normal during the period.

While an abnormally cold environment is one of the requisites of a heavy ice season and an abnormally warm environment is one of the requisites of a light ice season, other factors must be considered including the available berg supply upstream, the weather patterns, sea ice conditions, bottom topography and the water circulation. For example, water temperatures during March, April, and early May were colder than normal in 1963, yet 1963 was a very light ice year on the Grand Banks. This can be explained by the fact that the berg supply available to the Grand Banks at the start of the ice season was extremely low, as climatological conditions were generally unfavorable for berg drift south during the winter and early spring months. Nevertheless, all other factors being normal, the normal sea surface temperature charts can be used both qualitatively and quantitatively in berg forecasting. If a normal supply of bergs is available upstream at the start of the ice season, normal or abnormally cold surface temperatures on the Grand Banks and vicinity will indicate that a normal to heavy ice season is in prospect. During the 2 heaviest ice years in the past 13 years the respective isotherm charts of these years (1957 and 1959) indicated abnormally cold water temperatures. During the two lightest ice years (1951 and 1958) the respective isotherm charts indicated abnormally warm water temperatures. The 16–31 May and 1–15 June isotherm charts should be consulted prior to any decision to terminate the International Ice Patrol for a given year. Colder than normal temperatures, especially in the berg areas on the northern Grand Banks, the eastern slope and the Tail of the Banks, during the above periods indicates a strong possibility of bergs surviving to the major shipping lanes (Track C) as late as mid-July or even later, unless the upstream supply of bergs is very low and berg sizes are small.

WEATHER

GENERAL DISCUSSION

International Ice Patrol personnel over the years have pondered on the reasons for the great variety in the character of each ice season on the Grand Banks. The influence of weather on the annual iceberg problem has long been suspected. Smith's formula forecasting the number of bergs south of 48° N. each year (see Bulletin No. 30 in this

series) is based mainly on sea level atmospheric pressure anomalies in the North Atlantic during the preceding winter. Bergs spend their lifetime in basically an oceanographic environment which is largely determined by weather. Weather is a most important factor in the birth, lifetime career, and death of bergs. Undoubtedly summer weather in Baffin Bay and along the berg-producing glaciers in northwest Greenland has a distinct influence on the production of bergs, their subsequent distribution, and their deterioration there. The climate of the areas inhabitated by those bergs that have successfully reached the south-seeking Baffinland-Labrador Current system at the proper time must be assumed to be most critical in controlling or altering control of the drift and deterioration of the berg crop. The percentage of the available supply that reaches the Grand Banks is largely determined by the winter and spring weather along the east coasts of Baffin Island, Labrador, and Newfoundland. The distinctive character of each ice season is finally determined mainly by the winter, spring, and early summer weather in the vicinty of the Grand Banks. An average Grand Banks ice season, based on records since 1946, is three and one half months duration from early March to late June. The average ice season is governed by the climate of the continental shelf from glacier to the Grand Banks. Normal winds are favorable for iceberg drift to the Grand Banks in the winter but are neutral or unfavorable in the late spring and summer making it especially difficult for bergs to travel fast enough to survive to the Grand Banks after July. Add to this the fact that sea ice normally retreats to north of Labrador by the end of July and does not reappear in this area until late November, and the character of an average ice season becomes more easily understood.

The annual menace of icebergs to shipping near the Grand Banks of Newfoundland would not exist without the Baffinland-Labrador Current system. It must also be realized that the proportions the iceberg menace assumes each year is mostly governed by the weather. If the normal climate of the Baffin Bay, Davis Strait, and Labrador continental shelf were a couple of degrees warmer, an iceberg on the Grand Banks would be a rarity indeed. On the other hand, if the normal climate of the above regions and the Grand Banks was a couple of degrees colder, there would probably be hundreds of icebergs in the major shipping lanes 5 to 6 months a year annually. Abnormal winter weather has usually resulted in abnormal iceberg seasons. The winter and spring 1956–57 climate was abnormally cold in the Grand Banks, Newfoundland, Labrador area resulting in a 1957 ice season of 6½ months and hundreds of bergs invading the shipping lanes. The weather in 1957–58 was abnormally warm resulting in the lightest iceberg season on record in 1958, not a single berg surviving to the Grand Banks. A study of Ice Patrol records and weather records

will readily reveal that good correlation exists between the weather and the relative severity of the Grand Banks ice season. We have all heard or read about so-called warm weather or cold weather cycles and the fact that we have been in a warm cycle the past 20 or 30 years. Various weather cycles have been suggested, but accurate weather records probably do not exist for sufficient years to determine cycles with periods of several years. In reading the old reports of the International Ice Patrol, one is impressed by the fact that icebergs were in greater abundance in the major shipping lanes at the Tail of the Banks in the old days. One is also impressed with the fact that sea ice was a common occurrence at the Tail of the Banks in March and April in those days. As a rule, many bergs annually reached the Tail of the Banks during the first 25 years of Ice Patrol. As a rule, during the last 25 years, bergs have reached the Tail only during a few ice seasons. Likewise sea ice has rarely survided to the Tail of the Banks during the past 25 years. While the annual estimate of icebergs south of 48° N. latitude cannot be accepted as very accurate, it is, nevertheless, significant that the average estimated number of bergs during the last 25 years has been less than 60 percent of the first 25-year average. This is not to suggest a 25-year cycle, but is good argument that the Grand Banks to Labrador region has had a warmer climate during the past 25 years. It is likely that the climate has passed the warm peak and is now headed toward the cold part of the cycle. If so the International Ice Patrol is faced with a return to heavier ice seasons in the coming years.

As the old expression goes "Everybody talks about the weather, but nobody does anything about it." Well, it must be admitted that meteorologists are doing much more about the weather than they did when the expression originated. While theoretical approaches to the complex interrelated interactions of weather have not been the most productive, ever-increasing systematic synoptic observations are permitting a better understanding of weather, its causes, and effects. While our civilization has not as yet advanced to the sophisticated stage when capability exists to change weather, we do understand more about weather's changes. The general relationship between the relative severity of a Grand Banks ice season and weather has been discussed. What can we in the Ice Patrol do about the weather? We can seek to determine meaningful relationships between specific meteorological elements and ice conditions. Broadly stated, in order to conduct the Ice Patrol more effectively we must constantly strive for more accurate ice forecasting capability by learning more about weather, as well as other factors, and the consequent effect on ice conditions. The goal should be to eventually develop quantitative relationships for forecasting twice daily ice conditions on the Grand Banks. As long range forecasting involves complex and immeasurable

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factors, qualitative relationships should be sought in this area for the present. As northern ice survey data are accumulated and correlated with weather and other factors, quantitative relationships may eventually be developed. Daily forecasting of ice conditions during the period between observed ice conditions depends on the accuracy of the observed ice conditions and the forces acting on the ice between observations. One of the main forces affecting the drift and deterioration of ice is the wind. A quantitative relationship must be developed for the drift of icebergs of various sizes and shapes due to wind. Naturally, oceanographic factors must be taken into account. While the weather is most important in determining the amount of bergs that reach the Tail of the Banks, once in the swift moving Gulf Current, oceanographic factors are by far the predominant force acting on the bergs.

Long range forecasting may not be as urgently required as the twice daily forecasting of bergs in or near the shipping lanes, but it must be pursued if real meaningful progress is to be made on the latter. Simply stated, the more we can learn about icebergs and all the factors that influence them, the greater our capability to accurately forecast what will happen to them. We can develop long range forecasting ability by correlating observed ice conditions with known factors and hindcasting. True, the unavailability of reliable weather forecasts 1 month or even 1 week in advance is a serious handicap. The forecasts can be made assuming normal weather and both extremes. All the factors that cause and influence the Grand Banks iceberg problem can be classified into two basic groups, meteorological and oceanographic, both groups being highly interrelated. The basic meteorological factors are surface winds, air temperature and precipitation. The basic oceanographic factors are current, water temperature, sea ice, and bottom topography. The plan of approach is to make use of pertinent measurable factors and correlate with resulting ice conditions, while accounting for all other factors as practicable.

Hopefully a capability will be developed to forecast the severity of the ice season before it begins, and to make fairly accurate weekly and monthly forecasts of ice conditions on the Grand Banks. Forecasts made during the ice season can take into account a relatively abundant store of oceanographic data available. Preseason forecasts must depend mainly on meteorological elements, as oceanographic factors are for the most part, unobtainable during winter months in northern areas. There is consolation in the fact that, except for bottom topography, the oceanographic factors and changes therein will be largely accounted for by the meteorological elements to be considered and can reasonably be assumed. While the interactions between the atmosphere and the oceans are quite complex and not well understood, it is known that abnormal atmospheric pressure patterns will effect changes

in current systems. Likewise an abnormal atmospheric climate in a given region will be reflected in the waters of that region. Weather acts directly on ice causing immediate, noticeable changes in ice conditions and exerts an indirect, more subtle and slower acting influence on ice conditions by causing changes in the oceanographic environment. Changes in the relatively stable oceanographic factors are more gradual, less various, and believed less effective overall than the fickle meteorological elements in causing fluctuations in annual iceberg conditions.

Let us take a closer look at the specific meteorological elements which are assumed to significantly influence icebergs, their birth, lifetime career, and death. Precipitation is believed to be an important element only in the birth of bergs. Precipitation was necessary for the formation of the Greenland Ice Cap in the first place, and is a factor in the annual production of icebergs by their parent glaciers. Air temperature is an important factor on the entire life of bergs. Air temperatures influence the amount and type of precipitation and are probably a factor in setting up stresses in iceberg-producing glaciers. Air temperatures are important in helping to establish the environment of bergs during their lifetime. Surface wind is also an important influence on bergs from calving to destruction. Sea ice conditions along the berg route are dependent mainly on air temperatures and, to some degree, on winds. It is a fact of life that a berg must travel most of its long journey from glacier to the Grand Banks in protective pack ice. Even large bergs in near-freezing open sea water cannot ordinarily last more than 3 to 4 months out of the pack ice. Winter air temperatures at selected weather stations from Newfoundland to Baffin Island are available. A comparison was made with the number of icebergs south of 48° N. and the previous winter air temperatures, expressed in freezing degree days to a base of 32° F., at selected weather stations along the berg route for the past 8 years. (See table IV.) As could be expected the correlation is good. Also, the surface wind, as represented on U.S. Weather Bureau monthly sea level atmospheric mean pressure charts, was analyzed for its probable effect on iceberg drift toward the Grand Banks for each of the past 8 years. (See table III.) Correlation with the number of bergs south of 48° N. each year is remarkably excellent. While the measurement of air temperatures, expressed in freezing degree days or anomalies from normals, is rather absolute, the measurement of the wind and evaluated effect on iceberg drift south is far from absolute. Bottom topography is a very important consideration as are other factors, and some assumptions and judgments must be made. Yet it appears that the use of the monthly average pressure distribution and its estimated influence on iceberg drift offers the best correlation, and thus enables the most accurate long-range forecast on the severity of the coming Grand

Banks iceberg season. Weekly and monthly forecasts of ice conditions during the ice season should be made on the basis of previously observed ice conditions, subsequent weekly determined or forecast atmospheric pressure distribution, and Newfoundland air temperatures, taking oceanographic conditions into account.

Although correlation between winter weather and the relative severity of the Grand Banks iceberg season has been very good for the past 8 years, an important consideration has been overlooked. What about the number of bergs annually calved in the northwestern Greenland glaciers, and what about the Baffin Bay summer and early autumn weather and oceanographic conditions? This information is necessary in order to predict the number and sizes of bergs that properly time their arrival into the south-seeking Baffinland-Labrador Current system and have a reasonable chance of surviving to the Grand Banks. Considering the lack of data on berg-calving and the sparsity of meteorological and oceanographic data in Baffin Bay, forecast attempts of the above could not be expected to be accurate. This is all neatly accounted for by actually determining, in late October, the supply favorably located for reaching the Grand Banks next spring. The Grand Banks ineffectives, that is, the bergs that will deteriorate prior to arriving at the Baffinland Current in western Baffin Bay and those bergs whose arrival there is poorly timed, and other bergs not a factor, are eliminated from consideration. Sufficient data has been accumulated to reasonably locate the coming season's Grand Banks berg crop months in advance. Eventually a normal supply will be determined. After the first determination of the supply, a forecast can be made based on normal winter weather and based on both extremes. The forecast can be refined as the weather is monitored each month and as additional surveys are made. In any forecasting based on weather-iceberg relationships, the known or estimated supply should be taken into account.

Normal monthly mean atmospheric pressure distribution charts by the U.S. Weather Bureau, based on many years data, indicate that the winter weather along the east coasts of Newfoundland, Labrador, and Baffin Island is normally favorable for berg drift south toward the Grand Banks and survival. This seems to indicate that winter weather favorable for berg drift south is necessary for a normal Grand Banks iceberg year. It is purely hypothetical to discuss the possibility of a current system without any winds or vice versa and the resultant effect on the iceberg problem. Without the existing West Greenland-Baffinland-Labrador Current system, it is most difficult to imagine icebergs reaching Newfoundland. On the other hand, the current system alone could conceivably deliver bergs to the Grand Banks. The few bergs that might be delivered would probably stand a much better chance of staying in the main branch of the current

reaching the Tail. According to a theory by Smith (see Bulletin 30 in this series) there is considerable stranding of bergs from source to the Grand Banks caused by the coriolis force deflecting bergs moving in the current to the right or toward the coast. While this may be a factor, there is no evidence as yet that it is significant However, for the hypothetical case of a current system and no winds, the coriolis force might be significant when considered over the long berg travel time. Wind is a force which continually moves bergs about in or out of the axis of the current system, sometimes being helpful in moving them toward the Grand Banks and sometimes being unhelpful by causing temporary grounding, trapping, or permanent removal from the current system. At any rate, wind is a factor preventing bergs from getting maximum benefit of the permanent currents. Yet wind is also a factor in freeing the larger bergs from strandings in the shoaler waters of the continental shelf. By generating wind waves and swells, wind is a most important force in the destruction of icebergs and sea ice. The absence of wind would permit bergs to survive considerably longer. Thus it is concluded that, unless the coriolis force on bergs is significant, the current system alone could deliver bergs to the Grand Banks. Since winds do exist, they must be generally favorable for berg drift toward the Grand Banks during the winter and spring months in order for bergs to reach the shipping lanes.

There is somewhat of a snowball effect of winter weather along the Baffin Island, Labrador, and Newfoundland east coasts on the delivery of bergs to the Grand Banks. Pressure patterns in this area that are favorable for berg drift toward the Grand Banks must produce generally northwesterly winds. These winds are usually caused by the frequent outbreaks of very cold polar air masses in this area during winter. The greater the amount of northwesterly winds, the greater the freezing degree days, the greater amount of pack ice, and the colder the water. Greater amounts and thicker pack ice will be transported toward the Grand Banks. It is a fact that bergs are practically preserved in pack ice. They come down virtually intact in shape and size from the north once enveloped by the pack ice. There is no significant deterioration of bergs in close pack ice. Also predominant northwesterlies undoubtedly speed up the current system. Finally, colder winter temperatures along the berg route means colder Labrador Current water arriving at the Grand Banks during the ice season resulting in a colder berg environment. All this adds up to favorable conditions for bergs drifting toward and surviving to the shipping lanes on the Grand Banks. On the other hand, winds predominantly from the opposite quadrant, or southeasterlies, during the winter along the berg route and unfavorable for berg drift toward the Grand Banks will cause the same factors to adversely affect the berg crop's chances for survival to the Grand Banks.

In conclusion, the general relationship between weather and the Grand Banks iceberg problem has been discussed. Possible correlation between specific measurable meteorological elements and the resulting severity of the Grand Banks iceberg season has been explored. See other sections of this article for a discussion of the relationship between air temperatures and iceberg conditions and the relationship between surface winds and iceberg conditions. In order to establish meaningful and reliable relationships and thus improve forecasting capability, considerable northern ice observation will be required to determine the available supply, study its progress toward the Grand Banks, and correlate it with measurable and assumed factors.

THE EFFECT OF SELECTED MONTHLY MEAN SEA LEVEL ATMOSPHERIC PRESSURE DISTRIBUTION ON THE GRAND BANKS ICE SEASON

We in the Ice Patrol are naturally most interested in developing the capability to forecast the relative severity or lightness of each ice season before it begins. As stated in a previous section of this article, winter weather along the berg route is critical in determining the number of icebergs that will reach the Grand Banks. Specifically it is planned to demonstrate here that excellent correlation does exist between winter atmospheric pressure patterns and the relative severity of the coming ice season. Smith's formula forecasting the number of bergs south of 48° N. is based primarily on sea level pressure anomalies in the North Atlantic during the previous winter. While Smith's formula has been sufficiently accurate over the years to demonstrate that a correlation does exist between winter pressure patterns and the relative severity of the forthcoming Grand Banks iceberg season, it has not been sufficiently reliable. Of course the main reason for the shortcomings of Smith's formula is the fact that the available supply suitably located prior to winter is not accounted for. It must also be admitted that this formula is not sufficiently discriminating, as significant pressure patterns are likely to be averaged out. It is proposed that the sea level atmospheric pressure distribution be analyzed and the resultant effect on iceberg drift be qualitatively estimated on a monthly basis during the late autumn, winter, and spring in those areas inhabited by the oncoming season's iceberg crop. A systematic determination of the locations of the berg concentrations comprising the supply upstream is an important essential in evaluating the effect of pressure patterns on the drift of berg concentrations. The development of a relationship between monthly pressure distribution and resultant iceberg conditions will be useful for long range forecasting and will enable a more accurate assessment of the upstream berg potential during the ice season and will therefore also be useful in short range forecasting.

A study of the effect of mean surface wind, as indicated by the U.S. Weather Bureau monthly mean seal level atmospheric pressure charts, on the drift of the Grand Banks iceberg supply requires knowledge, or at least an educated guess, of the location and distribution of the crop during the months preceding the ice season. Limited evidence from the few preseason northern ice surveys conducted during the past 2 years and numerous data on the Grand Banks ice season indicates that as of early November next season's Grand Banks potential iceberg crop is located mostly from Hudson Strait entrance northward including the western half of Davis Strait and Baffin Bay to Bylot Island. For a more complete discussion of the location of the crop see another section of this Bulletin and also Bulletin 49 of this series. The distance encompassed by the crop is estimated to be about 950 miles and corresponds to an estimated average daily travel rate of 8 to 9 miles per day and a 3½ to 4 month ice season. As the effect of pressure distribution might vary considerably over a 950-mile stretch, it will be more discriminating to consider each half of the berg crop separately. The first group includes those bergs located between Hudson Strait entrance and Cape Dyer in early November. The second group includes those bergs located between Cape Dyer and Bylot Island in early November. The successive monthly locations of the two groups of the berg crop can be assumed or estimated using any available northern ice survey observations and taking into account drift due to the current system and atmospheric pressure patterns.

Beginning with the U.S. Weather Bureau November sea level pressure mean chart, each monthly chart is analyzed for the effect of the mean surface wind on the drift of each group. Each monthly chart is classified qualitatively as favorable, neutral or unfavorable for wind drift of each group toward the Grand Banks. Ice drift is assumed to be 5°–10° to the right of the mean geostrophic wind as portrayed by the isobars. The evaluation of the effect of monthly pressure distribution on the drift of the berg groups must, by necessity, be based largely on assumption. Naturally, the drift of individual bergs in a group will be more or less dissimilar for various reasons. The forces acting on bergs will vary with the location. The resulting movement of bergs will vary depending upon their various reactions on account of size, shape, and draft. It is intended that the average effect on most of the bergs in a group will be evaluated. Generally, monthly pressure patterns which effect the alongshore berg drift component are classified as favorable and those causing an opposing berg drift are classified as unfavorable. Pressure patterns causing berg drift alongshore are relatively simple to classify, whereas those patterns causing significant berg drift onshore or offshore, i.e., perpendicular to the current system, are more difficult to classify. Winds causing many of the bergs to ground or remain aground are classified unfavorable. Winds

driving many bergs seaward and out of the current system are classified as unfavorable. Very light winds or winds having an opposite effect on each half of the berg group are classified as neutral. Isobaric spacing is noted so that a qualitative determination of wind speed can be made. Needless to say it is not all that simple. If the evaluation of the effect of the average surface wind on the drift of the berg crop for a given month is to be sound and useful, other factors must be considered such as:

a. Knowledge of the Baffinland-Labrador Current system.

b. The progressive location and distribution of the crop along the glacier-to-Grand Banks route.

c. Bottom topography.

d. Sea ice conditions.

A knowledge of the Baffinland-Labrador Current system and branch currents is necessary so that the progressive movement of the crop downstream can be estimated and to evaluate possibilities of portions of the crop drifting into the branches and being eliminated, either temporarily or permanently, from the Grand Banks potential supply. While specific knowledge of the current system is meager, it is believed that available general knowledge is sufficient to begin this study. Analysis of berg drift toward the Grand Banks in the current system during the past 2 years indicates an average daily advance of about 7 miles per day under neutral wind conditions from Baffin Bay to the Grand Banks. It is suspected some temporary stranding periods may be included and this may therefore be a low calculation. The 8 to 9 miles per day advance previously mentioned takes into account the normally favorable winds for drift toward the Grand Banks during the winter and also likely delays due to temporary stranding. It is emphasized that the drift rates are averages for concentrations. Individual bergs will travel faster or slower than the concentration as a whole. Likewise, for periods of time the concentration may remain in or near the axis of the current and travel faster than the rate averaged over longer intervals including periods in the slower-moving sectors of the current. The axis of the current is assumed to generally parallel the coast just seaward of the 100–fathom curve.

The progressive location and distribution of the crop along the main route towards the Grand Banks must be estimated so that the effect of wind can be properly evaluated. There are two facets of interest here. One is the general location of the crop along the route. The other is the distribution or the locations of concentrations relative to the current axis and coast. The estimated location of the Grand Banks potential berg supply in early November has already been discussed. To determine the monthly progression of each half of the crop toward the Grand Banks, use is made of the last northern ice

survey observations. The positions of the concentrations are advanced to estimated positions for the date desired, based on average drift due to current and wind, taking into account bottom topography and sea ice conditions. The distribution of the concentrations, namely their locations relative to the coast and current axis, is a very important consideration. This, of course, must also be estimated based on last observations and estimated drift trend due to wind, while taking bottom topography and the current system into account. If the estimated along-current position of each half of the berg crop is incorrect by 100 or 200 miles this will not introduce any great error in evaluating the effect of pressure distribution, as there will normally be little or no significant difference in this relatively short distance. However, if the estimated berg distribution is significantly inaccurate, the effect of a monthly pressure pattern might be incorrectly classified. For example, if most of the concentrations of bergs were closer ashore than estimated, the effect of along-current winds might be unfavorable due to bottom topography, whereas favorable classification were incorrectly assigned. Likewise the reverse situation might occur when winds were classified as unfavorable due to an erroneous assumption that bergs were close ashore whereas in reality most of the bergs were well offshore and free to move. When no observations are available, it must be assumed that the groups are centered near the axis of the current unless previous pressure distribution patterns indicate otherwise. The point is that the along-current locations of groups and the locations of concentrations relative to the current axis must be estimated as accurately as possible in order to correctly evaluate the effect on their drift due to wind.

The importance of the bottom topography of the continental shelf and the coastal configuration from Baffin Island to the Grand Banks of Newfoundland on the iceberg problem has already been mentioned. Large bergs will normally ground in waters less than 90 fathoms, and medium bergs will generally ground in waters less than 50 fathoms. A study of the shelf waters from Davis Strait to the Grand Banks reveals the existence of many shoal areas of 100 fathoms or less extending well offshore and well into the colder arctic portion of the Baffinland-Labrador Current system. There are many natural traps along the berg route from Baffin Bay to the south, and some bergs are permanently trapped and removed as a threat to shipping near the Grand Banks. Perhaps the two most important permanent traps are Hudson Strait and Belle Isle Strait, where during some years many bergs are trapped. Aside from these two areas, larger bergs are generally immune to permanent trapping as their deep draft normally causes them to be grounded before getting into the many permanent type traps including the numerous bays, harbors, and other indentations and channels along the irregular coastlines. The current axis,

while well offshore, nevertheless flows over the shoaler coastal areas and must naturally carry many bergs aground. Onshore winds for a sufficient period of time can ground the entire group. The groundings in most cases, especially when considering the medium and larger bergs, are believed to be more or less temporary in nature causing delays in the trip. In other words, it is a matter of time until favorable winds will set them free. It is believed that the delays or lack of delays on the part of berg groups as they journey toward the shipping lanes are more significant than attrition due to permanent removal from the current system. The longer a berg group is delayed along the route the less chance it has to survive, or more accurately, the attrition of the group due to deterioration will be much heavier before arrival to the Grand Banks. More than 2 years of northern berg surveys have strongly indicated that deterioration of bergs is practically nil from Cape Chidley to the Grand Banks in the winter. Bergs reaching the Grand Banks in March and early April arrive intact. Those arriving later will normally begin to deteriorate prior to arrival. As the berg environment usually warms after March and becomes progressively warmer on the Grand Banks and vicinity, it becomes progressively more difficult for bergs to survive to the Grand Banks. Thus any delays to bergs which cause their arrival at the Grand Banks after, say mid-April, have the effect of reducing the season's Grand Banks berg potential. Admittedly the bottom topography of the Baffin Island and Labrador coastal regions is imperfectly known. Also the drifts of bergs can only be estimated on the basis of size, shape, and draft. At any rate, average onshore winds for a sufficient period of time will cause most of the berg group to ground. Subsequent offshore winds will free most of them to continue their journey toward the Grand Banks, while onshore winds or even alongshore winds will tend to contain them aground. Considering the bottom topography and current system direction along the Labrador and Newfoundland coasts, conditions are favorable for grounding of bergs especially with onshore winds. On the other hand, those same conditions are less favorable for bergs to float free again. The effect to tidal conditions can only be assumed. The overall tidal effect is believed negligible except possibly in areas such as Cumberland Sound, Hudson Strait, and Belle Isle Strait. The possibility of stranded bergs floating free due to deterioration effecting a lesser draft is believed negligible during the winter months. In conclusion, it is suggested that the bottom topography can have a tremendous influence on the berg crop by stalling or delaying its movement toward the Grand Banks. An evaluation of the effect of atmospheric pressure distribution on berg drift cannot be very worthwhile unless bottom topography is considered.

The effect of sea ice on the movement of bergs is truly unknown and can only be assumed. The importance of sea ice on the iceberg problem in general has already been discussed. It is strongly believed that icebergs would be nonexistent at the Tail of the Banks and rare on the northern Grand Banks if there were no sea ice along the Labrador coast. Sea ice, especially when in the form of close pack thick winter ice, must have a considerable influence on the movement of bergs, both directly and indirectly. Annually from December through May sea ice generally covers the entire continental shelf and considerable portions of the continental slope of Baffin Island and Labrador. As winter advances the sea ice spreads farther south reaching a maximum during late March and early April in the vicinity of the Grand Banks. Assuming that the Grand Banks berg crop must be south of Cape Dyer by late January and south of Cape Chidley by early March, fast ice is not considered a very important factor in trapping the bergs and halting their motion. The forces of the Baffinland-Labrador Current system, the wind, and the tides, being what they are in this area, prevent significant formation and duration of fast ice from Cape Dyer south. True, fast ice of a winter's duration is probably formed in well protected bays and inlets such as Cumberland Sound and Frobisher Bay. However, most bergs in those areas are smaller-sized than normal and for the most part are permanently trapped and already removed from the Grand Banks potential. Fast ice of relatively short duration may exist inside the headlands and island chains from Cape Dyer to the south but any significant effect on delaying bergs is dubious as a combination of the forces of the current system, wind, tides, and bottom topography are believed dominant.

While the effect of the winter's fast ice on delaying the next season's Grand Banks berg crop has been somewhat discounted, the effect of the Baffin Bay-Labrador pack as a whole on the crop movement may be very significant. For example, aerial ice observations indicate that bergs enclosed in thick winter close pack ice are generally inclined to move with the pack. Forces of wind, current, and tide acting on close pack ice seem to be transferred to the enclosed bergs and vice versa, with the result that they tend to move together with bergs locked in the embrace of the pack ice. This is not true when the pack ice is young or when open water areas exist near a berg, as the different forces acting on berg and pack ice are sufficient to overcome any restraint of one on the other. Naturally if a berg grounds and other forces tend to keep it aground, the pack ice will bypass the berg leaving a lee in the direction of movement. Smaller and medium bergs are more likely to stay locked in with the pack ice for longer periods than larger bergs. The disparate forces acting on the larger bergs and pack ice are more likely to be of sufficient magnitude to

overcome any restraint of one on the other. Does the pack ice cause the berg to move faster by transferring some of the forces acting on it or does the pack slow the berg down by acting as a restraint and resisting the motion of the berg? On the basis of aerial observations, wakes of bergs in the pack ice are generally downwind indicating a faster movement of the pack ice due to wind. This would indicate that generally bergs in pack ice are pushed by the pack ice with the wind. However, most pertinent is the probability that, in spite of sea ice pushing and assisting in the transport of icebergs, an extensive cover of sea ice upwind may really act as an indirect deterrent to berg movement by preventing wind driven currents to be generated. The assumed deterrent effect of sea ice on the generation of wind driven currents is probably most pronounced for alongshore or offshore winds. This may render difficult any significant berg movement seaward and consequent elimination from the Labrador Current. The point is that the downwind push of sea ice on bergs may not compensate for the loss in berg drift due to the prevention of wind driven currents being generated in extensive sea ice areas. Wind driven currents from onshore winds would conceivably be generated even though less effective. Thus onshore winds are more likely to ground bergs than offshore winds are likely to drive bergs out of the current system. The affect of pack ice acting as a fender along the coast to reduce stranding of bergs must also be considered. Smith assumed this effect to be of paramount importance. See Bulletin 19 in this series. Smith's berg forecasting formula included a parameter for sea ice because of this assumed buffer action on the part of sea ice. Smith believed that the greater the sea ice, the lesser the number of stranded bergs. While this is probably true, it is suggested that the main reason for the excellent correlation between the relative abundance of sea ice and the relative number of bergs reaching the shipping lanes is the berg preservation characteristic of sea ice. Considerable evidence from Ice Patrol seasonal flights in the Grand Banks, Newfoundland, and southeastern Labrador coast and limited evidence from northern ice surveys all indicate that pack ice will be driven close ashore and bergs contained therein will be stranded by sustained onshore winds. As winds become offshore, pack ice will once more drift out to sea, as will most of the bergs, to once more be swept along by the Labrador Current toward the Grand Banks. A restraining force is probably exerted on bergs by pack ice depending upon thickness and concentration, but it is known that onshore winds of sufficient force and duration can overcome the sea ice fender affect. It is emphasized that this discussion relates to the sea ice effect on the next season's Grand Banks berg crop south of Cape Dyer. No attempt is made here to assess the effect of pack ice on the movement of bergs in Baffin Bay

except to say that fast ice becomes a very important factor as does the timing of the freezeup and the breakup of pack ice there.

The fact that the movement of bergs embraced by the pack ice is subject to the movement of the pack ice for considerable portions of the crop's journey from glacier to Grand Banks has already been stated. If this is true it behooves us to learn more about the forces that cause sea ice to move. The two main forces are the Baffinland-Labrador Current system and surface wind. The force of the current system is self-explanatory. The pack ice, without any wind, will be carried with the velocity of the surface current unless obstructed by fast ice alongshore or pack ice jams downstream. The movement of bergs in the current system is more complex, as the surface current and depth current acting near the base of the berg may have different values. Without wind, bergs will move at the average current velocity from surface to berg depth unless obstructed by pack ice or bottom topography or unless pushed and carried by the pack ice. Existing wind will exert a pressure on pack ice depending mainly on its roughness, amount of ridging and hummocking, all of which tend to increase the pressure due to wind and consequently drift due to wind. Water will offer some resistance to the motion depending upon the speed. While bergs embraced by close pack heavy ice generally are subject to pressures from the pack ice and move accordingly, those bergs with considerable sail area probably transfer pressure to the pack ice and move it faster during windy periods. On the other hand, the underwater portion of a berg must create considerable resistance due to motion relative to the water.

In conclusion, sea ice does affect berg movement significantly and is a factor that must be considered to properly evaluate the drift of bergs due to atmospheric pressure patterns. The sea ice influence on berg drift is very difficult to assess and properly evaluate. It is concluded that onshore winds generally are more effective in moving sea ice and bergs out of the Baffinland-Labrador Current system axis than are offshore winds. It is assumed to be difficult for a significant portion of the crop to be eliminated from the current system by being driven out to sea as the generation of wind driven currents is impeded by the sea ice. However, during the later part of the ice season as the pack ice deteriorates and the limits recede northwestward, offshore winds in the Notre Dame-Belle Isle area can be most effective in eliminating most of the second half of the crop. Generally, onshore winds of sufficient strength will be assumed to have grounded most of the berg concentrations unless observed ice conditions indicate otherwise. Systematic northern ice surveys for the months preceding the Grand Banks ice season will permit observation of sea ice conditions, enable intelligent estimates of sea ice conditions, and thus allow a more knowledgeable evaluation on the effect of sea ice.

It is easy to see that an evaluation of the effect of a given monthly pressure distribution must take the factors discussed into account. For example, strong offshore winds may be classified as very favorable if grounded bergs are returned to the transporting agency. A month of strong onshore winds might be classified favorable if it follows a history of offshore winds. A month of light winds might be classified as unfavorable if grounded bergs remained so. A month of winds effecting an alongshore drift paralleling the current may not be necessarily favorable if grounded bergs were unable to drift free.

In addition to the assumptions that must be made when evaluating the effect of mean surface wind on the drift of a berg group, many uncertainties exist. The monthly mean pressure distribution might mask significant shorter period patterns. For example, the first 2 weeks of a given month might have strong onshore flow sufficient to permanently trap a large portion of the crop in such areas as Hudson Strait, Belle Island, and where shoals protrude well offshore. The last 2 weeks might be featured by strong offshore winds unable to free the bergs. The monthly mean winds would appear neutral while their true affect was very unfavorable. The Baffin Island and Labrador coastline is featured by precipitous mountains. This geological factor probably causes a local deviation in gradient winds to more closely parallel the coastline than the monthly pressure distribution might indicate. Other uncertainties, including oceanographic factors, exist. Oceanographic data is sparse and impracticable to obtain in upstream northern areas before or during the ice season. Unknown factors affecting iceberg drift probably exist. In spite of the assumptions that must be made and the resulting uncertainties, it is believed that an analysis of monthly mean pressure distribution and all factors involved will permit an educated estimate of its effect on the Grand Banks potential iceberg supply and will yield a good indication of the severity of the coming iceberg season.

In order to test the validity and usability of the method described for forecasting, U.S. Weather Bureau monthly mean sea level atmospheric pressure charts were evaluated in the manner described for the years 1957–64. See table III. Positions of berg concentrations were based almost entirely on assumption during the preseason months for the years 1957–62. Preseason northern survey observations were available only for the 1963 and 1964 ice seasons. The classification of each monthly mean pressure distribution for each half of the berg crop for each year is shown in table III. The monthly means for November–April were evaluated for their effect on drift of the first half of the crop toward the Grand Banks, and the monthly means for November–June were evaluated for their effect on drift of the second half of the crop. It was assumed that the first half of the berg crop arrived near the Grand Banks by early May, thus the months

of May and June were not applicable to this group. The following numerical values were assigned each classification to facilitate determination of an overall classification for each year: VF=3, F=2, SF=1, N=0, SU=−1, U=−2, VU=−3. For the first group, double weight was assigned the December–April grades, and for the second group, double weight was assigned the January–June grades. Months prior to November were not considered for reasons previously discussed. For the first half of the crop, the November classification was assigned only half weight due to uncertainties involved. For example, very favorable winds might result in many bergs moving south faster than the sea ice can overtake them, thus causing considerably greater deterioration than normal. November and December classifications for the second half of the crop were assigned half weight, as, during this period, this group is believed to be located north of Cape Dyer and it is difficult to estimate the effect of winds there. For example, easterly winds during this period might result in driving many bergs from the glacier areas near Disko Bay and Upernavik into the Baffinland Current, but might also result in driving aground the supply already in the Current from Cape Dyer to Bylot Island. Whether the overall effect is favorable or unfavorable on the Grand Banks berg crop is difficult to assess. A study of table III reveals the following information:

1. For the years 1957–64, the average estimated number of bergs south of 48° N. is 314 compared to a 65-year average since 1900 of 381.

2. Wind conditions were favorable for berg drift towards the Grand Banks for 4 years, unfavorable for 3 years, and neutral for 1 year.

3. The highest classification was assigned to 1957, which was the most severe iceberg year for the years studied. The 2 years receiving the next highest classification, 1959 and 1964, were the next two heaviest ice seasons respectively. The lowest assigned classification was SU for the 1958 and 1963 years, both of which had extremely light iceberg seasons.

4. The years assigned unfavorable or neutral classification, were all below normal iceberg years. The years assigned favorable classification were normal or above normal. The one exception was 1960, which was classified slightly favorable and which was a little below normal iceberg year.

5. If a classification was assigned for each season only through the month of February, there would naturally be some differences from the classifications assigned the whole period, that is through June. However, 1957 would still be classified as the most favorable year of the 8 for berg drift toward the Grand Banks, and 2 of the other 3 favorable years would still be classified favorable. However, 3 other

years 1958, 1961, and 1962 would also be classified slightly favorable if considered only through February in lieu of the neutral or unfavorable classification assigned for the entire period.

6. Wind conditions for the second half of the crop from March–June were favorable for berg drift toward the Grand Banks only during 1957, 1959, and 1964, the heaviest three iceberg seasons of the eight and the three latest seasons.

The following conclusions are drawn:

1. On the basis of a scale ranging from VF to VU, a SF+ or higher classification is required for a normal or heavier than normal Grand Banks iceberg season.

2. An N or below classification corresponds with a light and well-below normal iceberg season.

3. A study of the period November–February reveals a favorable classification for 6 of the 8 years considered with an unfavorable classification assigned only to 1 year, 1963. This is overwhelming evidence that winter winds are usually favorable for berg drift toward the Grand Banks. The relative favorability through February reveals the trend and is a good indicator of the severity of the coming ice season.

4. A normal to severe ice season requires favorable winds for the first half of the crop for the period March–April and requires favorable winds for the second half of the crop for the period March–June. Thus an accurate forecast of the coming iceberg season before the season starts cannot be expected solely on the basis of wind conditions through February.

5. It must be noted that the classifications were assigned the months November–February for the years 1957–62 with very little or no observations of the berg crop available. Positions of the groups were almost entirely assumed. With observations based on northern ice surveys available in future years more accurate classifications can be assigned and a more accurate trend will be indicated before the Grand Banks ice season starts.

6. For the years 1957–64, there is remarkable correlation between the classification of winter and spring wind conditions along the Baffin Island, Labrador, and Newfoundland coasts and the relative severity of the corresponding Grand Banks iceberg season. While only a trend can be revealed at the start of the ice season, a qualitative forecast can fairly accurately be made on the basis of November–February wind conditions if the upstream berg supply is known and the climate is taken into account.

Table III. Average Monthly Surface Wind Conditions for Berg Drift Toward Grand Banks, 1957–64 Ice Seasons and the Severity of the Resulting Grand Banks Iceberg Seasons

[Based on U.S. Weather Bureau monthly mean sea level pressure distribution charts]

Month	1957		1958		1959		1960		1961		1962		1963		1964	
	1st half berg crop	2d half berg crop	1st	2d	1st	2d	1st	2d	1st	2d	1st	2d	1st	2d	1st	2d
November	VF	VF	SF	N	VF	SF	F	SU	SF	N	SU	N	U	U	N	U
December	VF	VF	SF	SF	VF	F	VF	F	F	F	U	U	U	VU	F	N
January	VF	VF	F	SF	SU	SU	SU	SF	F	F	VF	N	U	VU	VF	VF
February	VF	F	U	U	VF	VF	U	N	VF	F	SF	F	F	SU	F	SF
March	N	U	U	U	VF	SF	SF	N	SU	SU	VU	VU	VF	U	VF	U
April	VF	VF	VU	N	F	F	F	SF	SU	U	SF	U	U	U	VF	F
May	....	VF	....	VU	....	F	....	N	....	U	....	N	....	N	....	VF
June	....	VF	....	VU	....	N	....	VU	....	U	....	U	....	U	....	N
Esitmated overall average during travel time.	VF−	F+	SU−	SU+	F	SF+	SF−	N	SF−	SU−	N	SU−	SU−	U−	F+	SF
	VF−		SU		F−		SF−		N		SU−		SU		F−	
Nr. bergs south of 48° N.	931		1		693		253		115		121		25		369	

CODE:
F = Favorable.
U = Unfavorable.
V = Very.
S = Slightly.
N = Neutral.

NOTE: To estimate overall wind conditions for each year, give double weight to months December–April for 1st half of berg crop and double weight to months January–June for 2d half of berg crop.

THE CORRELATION BETWEEN WINTER FROST DEGREE DAYS OF SELECTED BAFFIN ISLAND-LABRADOR-NEWFOUNDLAND COASTAL STATIONS AND THE RELATIVE SEVERITY OF THE GRAND BANKS ICEBERG SEASON

The previous section discussed the excellent correlation between winter winds and the subsequent Grand Banks iceberg season. It is only natural to also investigate the possible correlation between the winter climate of areas inhabited by the berg crop as it travels from Baffin Bay in the Baffinland-Labrador Current system toward the Grand Banks. While air temperature per se has no direct influence on the movement of icebergs, it does have a direct, as well as an indirect, influence in determining the environment of icebergs. Generally, colder than normal air temperatures will directly effect a colder environment for the above-water portion of icebergs and will indirectly effect a colder water environment, possibly for the duration of the bergs' lifetime. Colder air temperatures will generally result in a greater abundance of pack ice and a colder Baffinland-Labrador Current and bergs will probably travel with this colder environment to the Grand Banks. Thus the berg supply can be expected to arrive at the Grand Banks in greater numbers and larger sizes during cold years. It is true that colder air temperatures do coincide with winds from the west and northwest during frequent outbreaks of polar air masses in the winter along the Baffin Island, Labrador, and Newfoundland coasts. If winds from the opposite southeast or east quadrant had the colder temperatures, correlation between air temperatures of the relative severity of the Grand Banks iceberg season would be very poor. Thus, it must be admitted that if correlation is good, it is partially incidental as colder temperatures will naturally accompany the westerlies and northwesterlies which are most favorable for transporting ice towards the Grand Banks. Inasmuch as the average winter air temperatures in the region will considerably influence the berg crop environment along the entire route, a considerable influence on the deterioration and survival of the berg crop can be assumed. If good correlation is developed between average winter air temperatures and the relative severity of Grand Banks iceberg season, this correlation can be useful as another indication in iceberg forecasting.

An excellent indication of the winter climate in the critical northern areas can be obtained by considering the temperatures of key weather stations there. A quantitative determination of the climate at a given station for a given period can be made by computing the accumulation of frost degree days. A frost degree day is defined as a day with a mean temperature 1° F. below an arbitrary base. A day with an average temperature of 24° F. results in an accumulation of 8 frost degree days (FDD) if the base of 32° F. is used. See table IV for data on accumulated frost degree days for selected key stations 1956–

63. Data was supplied by the U.S. Naval Oceanographic Office. FDD's listed are those accumulated for each station from 1 September through 15 March. Warming degree days, or days with average temperatures above 32° F. are not accounted for. Admittedly a more accurate indication of the climate at the stations should allow for deduction of the warming degree days. While warming degree days are not a factor at the northern stations of Clyde River and Resolution Island during the autumn and winter months, they are a factor at the Labrador-Newfoundland stations. Also, the same periods were used for all stations in computing the accumulated FDD's, including periods of time before the berg crop had arrived and after the crop had passed by a given station. It would probably be more meaningful to compute station FDD's for the interval of time that the berg crop is in the locality. Nevertheless, the correlation between FDD's for the selected stations along the iceberg route and the relative severity of the Grand Banks iceberg season is good.

A study of table IV reveals the following facts:

1. The highest accumulation of FDD's for every station occurred in 1957. This was the heaviest iceberg season during the period.

2. All stations except Clyde River had much below average FDD's in 1958. Cartwright and Hopedale both had the smallest number of FDD's in 1958 of any year from 1956–64. 1958 was the lightest ice season during the period considered.

3. Cartwright and Hopedale appear to give the best correlation. This might be expected as the period of time when the Grand Banks berg crop is in the area of Hopedale and Cartwright more closely coincides with the period that FDD's are accumulated there.

4. The poorest correlation was obtained for 1963. All stations except Clyde River had an average or greater than average number of FDD's in 1963. Yet the corresponding iceberg season on the Grand Banks was very light. Preseason northern iceberg surveys revealed that the iceberg supply was extremely light as early as January. It is believed that strong offshore winds in the area from Cape Chidley to Cape Dyer in November and December 1962 drove most of the first half of the crop out of the current system and out to sea between Greenland and Resolution Island.

It is concluded that the correlation between the accumulated FDD's during the winter at selected stations along the Baffin Bay to Grand Banks berg route and the relative severity of the Grand Banks iceberg season is good. While the correlation does not appear to be close enough for forecasting purposes, it nevertheless gives good indication of the coming ice season, especially the pack ice conditions. Any forecasting based on monthly atmospheric pressure distribution and the known upstream supply should be prejudiced by the relative amount of accumulated FDD's at selected stations as compared to the average

for the past 9 years. For the future it is recommended that accumulated FDD's be determined for each particular station only for the period when the berg crop is in the vicinity of each particular station. It is also recommended that warming degree days be deducted so as to obtain the net FDD's for the stations of Hopedale, Cartwright and St. Anthony. For example, FDD's would be accumulated for the following stations during the intervals listed:

Station:	*Period*
Clyde River	September–December
Cape Dyer	October–January
Resolution Island	November–February
Hopedale	November–March
Cartwright	December–April
St. Anthony	January–May

A forecast at the start of the ice season can be prejudiced by the accumulation of FDD's of the various stations at that time as compared to mean accumulations.

Mean accumulations listed in table IV are for the entire period September–15 March. Mean accumulations for each month would enable a monthly comparison of actual FDD accumulations during each winter. See table V for monthly mean accumulations of FDD's graciously supplied by Mr. W. Markham, head of Ice Forecast Central, Department of Transport, Halifax, Nova Scotia. Note that the annual means from tables IV and V are in fairly good agreement when it is realized that the means are based on different periods of time during each year and a different number of years. The values in table V are probably more representative of true means as they are assumed to be based on many years data. It is felt that the correlation of FDD's of selected stations and the relative severity of the Grand Banks iceberg season is sufficiently promising for use in prejudicing iceberg forecasts made on the basis of monthly pressure patterns and the available supply before the season starts.

BAFFIN ISLAND, LABRADOR, AND GRAND BANKS, NEWFOUNDLAND WEATHER DURING THE 1964 ICE SEASON

The monthly atmospheric pressure patterns and their effect on ice conditions for 1964 were previously discussed. As indicated in table III, predominant winds were generally favorable for iceberg drift toward the Grand Banks and for iceberg survival during the late autumn, winter, and spring months along the berg route. See figures 54–61 for the U.S. Weather Bureau monthly mean sea level atmospheric pressure distribution from November 1963–June 1964. The climate was abnormally cold as indicated by the greater than normal accumulations of frost degree days at selected stations. See table IV. Note that each selected station had a greater than normal amount of FDD accumulations for the winter of 1963–64. Indication of the

Table IV. Frost Degree Days Accumulation for Selecteed Baffin Island, Labrador, and Newfoundland Stations—September Through 15 March—Winters 1956–1964

Station	1956	1957	1958	1959	1960	1961	1962	1963	1964	Average 1956–64
Clyde River	4,920	6,787	6,289	6,454	6,154	6,348	6,760	5,364	6,030	6,124
Resolution Island	2,324	4,197	3,032	3,321	3,019	3,480	Msg.	3,899	4,489	3,445
Hopedale	1,891	3,429	1,821	3,007	2,207	3,005	2,531	2,938	2,912	2,640
Cartwright	1,488	3,034	1,458	2,764	1,611	2,614	2,067	2,225	2,504	2,280
St. Anthony	791	2,136	864	1,924	1,021	1,899	1,283	1,453	1,650	1,445
Number Bergs south of 48° N	80	931	1	693	253	115	121	25	369	288

Table V. Mean Monthly Frost Degree Days Accumulations for Selected Stations October–March

Station	October		November		December		January		February		March	
	Month	Total	Month	Total	Month	Total	Month	Total	Month	Total	Month	Total
Clyde River	392	392	810	1,202	1,302	2,504	1,457	3,961	1,438	5,389	1,395	6,784
Resolution Island	124	124	330	454	713	1,167	1,023	2,190	924	3,114	775	3,889
Hopedale	0	0	287	287	651	938	723	1,761	596	2,357	589	2,946
Cartwright	8	8	120	128	496	624	744	1,368	644	2,012	465	2,477
St. Anthony	0	0	69	69	311	380	566	946	580	1,526	339	1,865

NOTE: Number of years used to determine the means are unknown.

climate of the east coast of Newfoundland is given by table VI. Note that the average temperatures for the winter and spring of 1964 at Torbay and Argentia were below normal. The indirect effect of the abnormally cold winter climatology in the Baffin Bay-Davis Strait and Labrador regions made itself felt on the Grand Banks beginning in April as the abnormally cold waters of the Labrador Current and its freight of heavy pack ice invaded the area.

There was above normal cyclonic activity in the Grand Banks, Newfoundland, and Labrador coastal regions in March. During the first 2 weeks cyclones moved rapidly over Newfoundland and Labrador and intensified before slowing down or becoming stationary and filling south of Greenland. This resulted in strong cold northwesterly winds along the Labrador and Newfoundland east coasts. During the latter half of March the storm track shifted to the south and a series of intense lows passed southeast of Newfoundland producing strong north by east flow over the northern Grand Banks and northward. See figure 37 mean sea level pressure chart for period 6–28 March 1964. As a result, the numerous bergs between the northern Grand Banks and Belle Isle at the start of March were driven rapidly toward the Grand Banks during the first 2 weeks and then driven to the southeast toward or along the Newfoundland east coast during the last half of March.

From late March to mid-April a series of moderate lows moved across northwestern Newfoundland and eastern Labrador due to a shift of the Azores High to the northwest of its normal position for April. A relatively tight gradient resulted producing a strong warm southwesterly flow over the Grand Banks and east coast of Newfoundland. Surface winds along the Labrador east coast averaged northwesterly during this period. See figure 38, mean sea level pressure chart for 29 March–16 April 1964. The distribution of bergs by mid-April was considerably influenced by the average southwest winds during this period as numerous bergs were driven from along the east Newfoundland coast to the eastward with many reentering the Labrador Current between 48°–49° N., thereby moving rapidly eastward under the combined forces of wind and current. The indirect effect of the abnormally cold winter climate in the Baffin Bay, Davis Strait, and Labrador region made itself felt on the Grand Banks about this time as abnormally cold water of the Labrador Current invaded the Grand Banks.

At mid-April the weather pattern abruptly changed as a series of lows moved south of Newfoundland toward the central North Atlantic. Winds consequently averaged strong northerly over the northern Grand Banks during the period 17 April–4 May. Winds averaged onshore along northeast Newfoundland and Labrador. See Figure 39. Ice conditions were markedly affected by this pat-

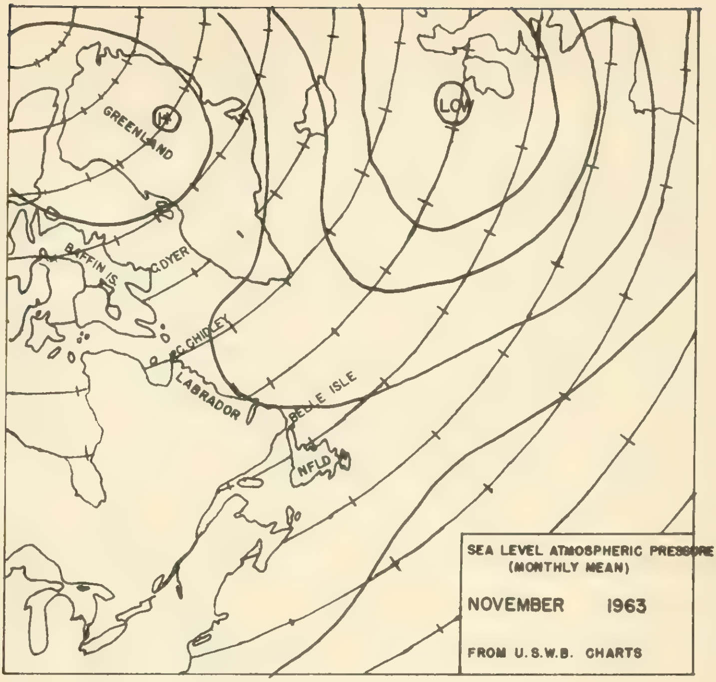

FIGURE 54.—Mean sea level pressure, November 1963.

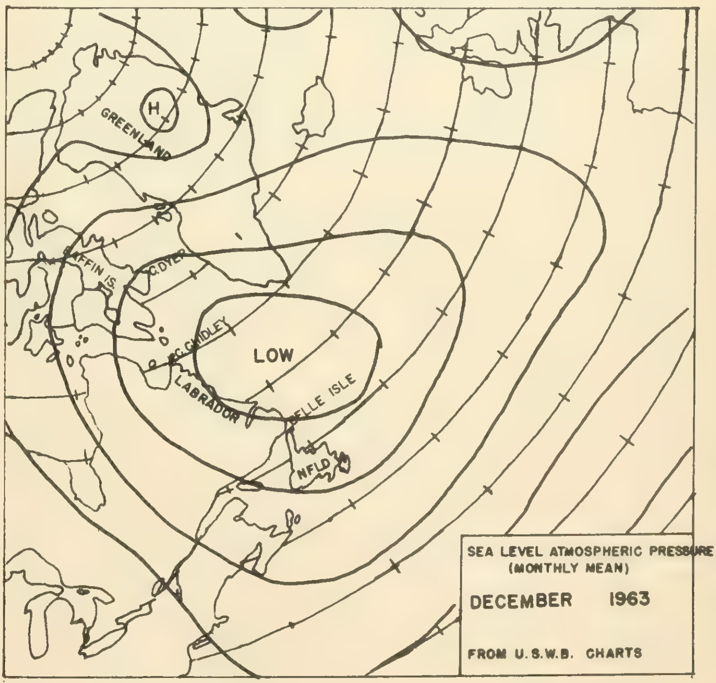

FIGURE 55.—Mean sea level level pressure, December 1963.

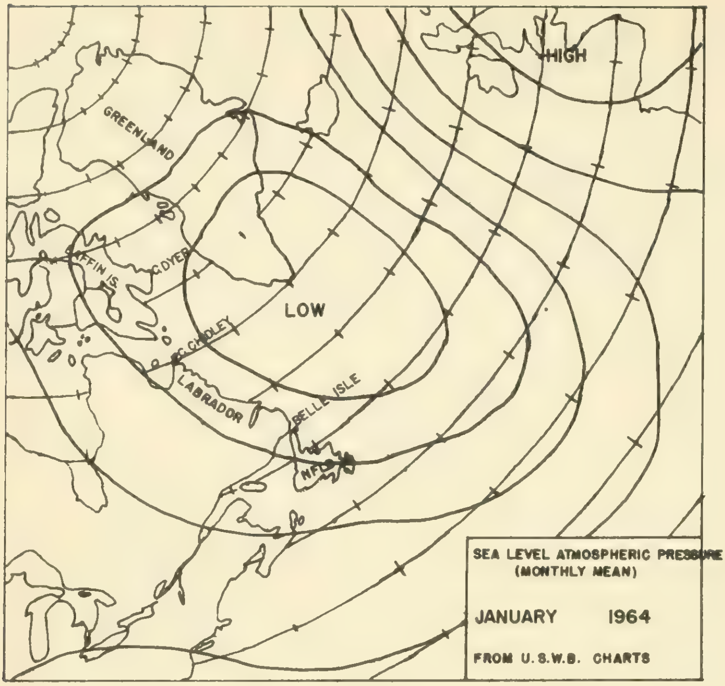

FIGURE 56.—Mean sea level pressure, January 1964.

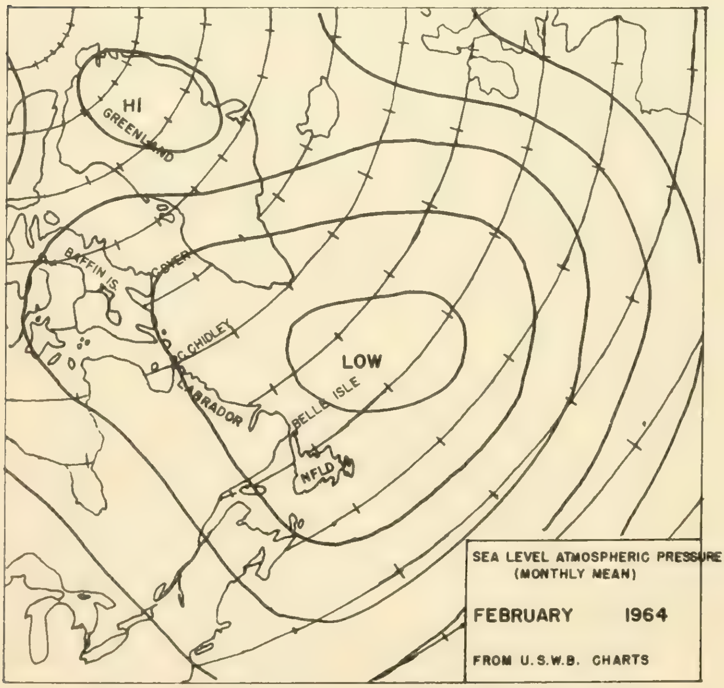

FIGURE 57. Mean sea level pressure, February 1964.

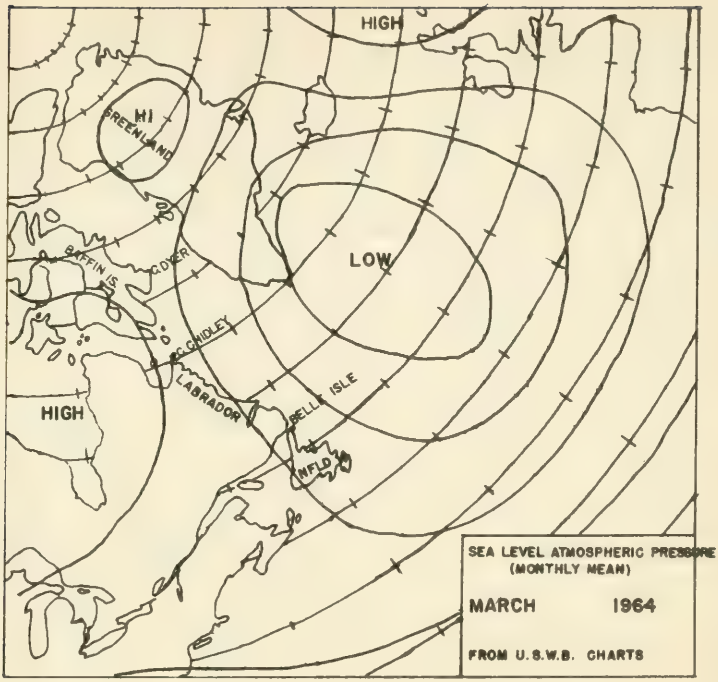

FIGURE 58.—Mean sea level pressure, March 1964.

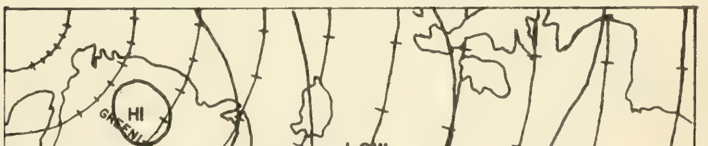

FIGURE 59.—Mean sea level pressure, April 1964.

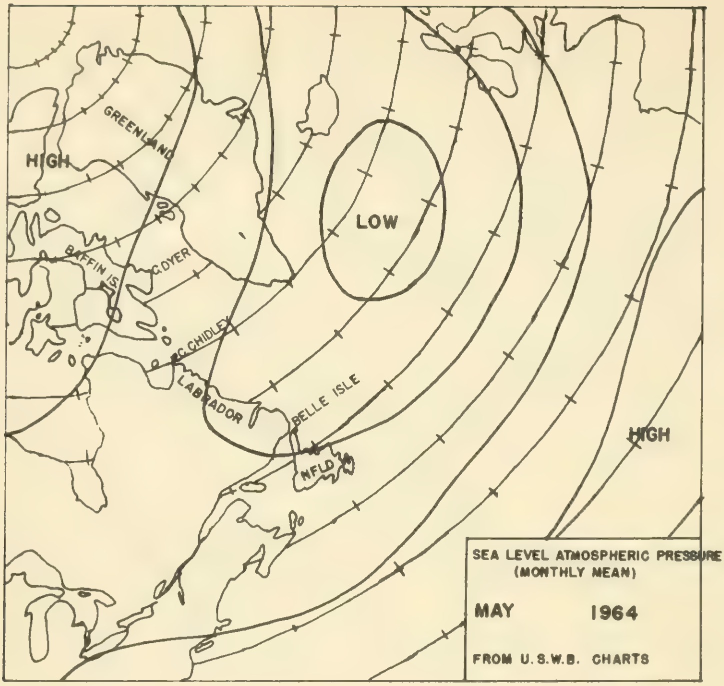

FIGURE 60.—Mean sea level pressure, May 1964.

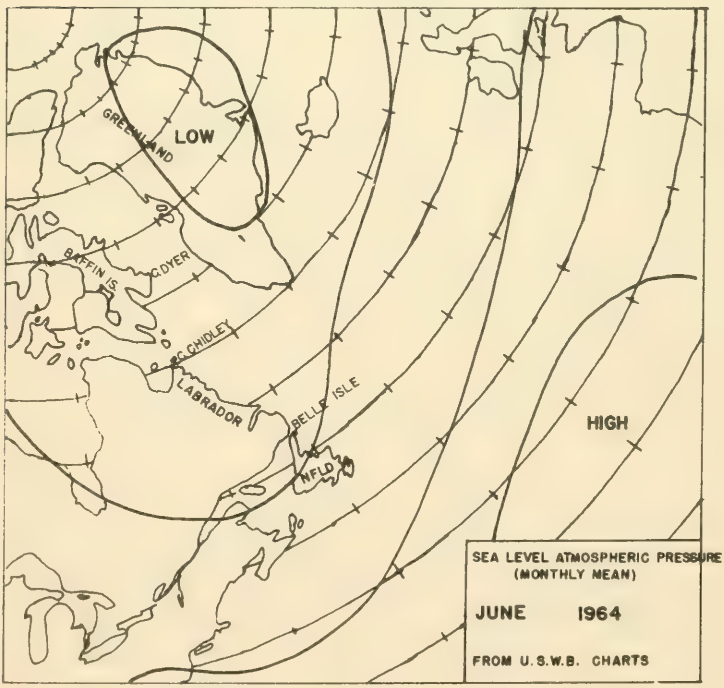

FIGURE 61.—Mean sea level pressure, June 1964.

tern. See Figures 20 and 21, Ice Conditions for 16 April and 1 May respectively. Air temperatures over the area were slightly warmer than normal during April.

During the first 3 weeks of May, winds over the northern and western Grand Banks averaged north-northwesterly while winds averaged northwesterly to westerly over the eastern and southern Grand Banks and vicinity. This was due to a series of lows passing south of Newfoundland and slowing down or becoming stationary near Ocean Station Charlie. Winds averaged onshore in the Notre Dame Bay area and alongshore from there northward along the Labrador coast. See Figure 40. As a result, bergs on the western and northern Grand Banks continued their southern drift or grounded and slowly deteriorated. Bergs on the eastern slope of the Grand Banks were driven to the southeast into warmer waters out of the Labrador Current and rapidly deteriorated. Bergs and pack ice from the north were being fed into the Notre Dame Bay area during this period. During the remainder of May the storm track shifted to the north of Newfoundland resulting in fairly strong southwesterly winds over the Grand Banks and coastal regions north up the Labrador coast. See Figure 41. Subsequently the many bergs temporarily trapped in the Funk Island, Fogo Island, and Notre Dame Bay regions were driven offshore with many entering the Labrador Current north of the Grand Banks. The mean air temperature in May for the Grand Banks region was estimated to be 5° F. below normal.

Table VI. Mean Monthly Temperatures Torbay and Argentia, Newfoundland, December 1963–June 1964

	Torbay			Argentia		
	Actual	Normal	Anomaly	Actual	Normal	Anomaly
December	29.1	27.4	−1.7	33.2	30.4	−2.8
January	25.1	22.7	−2.4	28.4	26.7	−1.7
February	24.4	25.3	+0.9	27.1	29.2	+2.1
March	27.3	23.8	−3.5	30.3	28.0	−2.3
April	34.5	35.2	+0.7	36.3	36.5	+0.2
May	42.2	40.5	−1.7	42.3	39.9	−2.4
June	50.5	49.6	−0.9	49.1	43.4	−5.7
Average during entire period	33.3	32.1	−1.2	35.2	33.4	−1.8

Surface winds were light and variable for the Grand Banks region and offshore from Notre Dame Bay northward the first 12 days of June. See Figure 42. During the remainder of June winds averaged southwesterly over the Grand Banks and vicinity with similar direction but diminishing force in northward areas. See figure 43. Accordingly bergs that survived to the northeast slope of the Grand Banks generally drifted east and out of the south-seeking Labrador

Current. Surface air temperatures for the Grand Banks and Newfoundland east coast remained below normal.

As the Azores High was in its normal July location, winds averaged southwesterly over the Grand Banks and northward. See Figure 44, mean sea level pressure chart for July 1964. The gradient was fairly tight over the southern Grand Banks with a gradual loosening to the northwest. As winds were relatively light and sea temperatures below normal, bergs survived longer than usual this time of the year near the northern Grand Banks. Winds were nevertheless of sufficient strength and direction to drive the declining survivors out of the Labrador Current to the north of Flemish Cap, thereby removing them as a threat to the major shipping lanes farther south.

The discussion of the weather with its characteristic and distinctive weather patterns during 1964 and its effect on ice conditions amply demonstrates the close relationship between the weather and resultant ice distribution.

NORTHERN ICE SURVEYS

GENERAL DISCUSSION

The systematic preseason northern ice surveys by aerial reconnaissance, begun in January 1963, were continued in 1964. The major objective of these preseason surveys is to forecast the character of the forthcoming Grand Banks iceberg season by determining the iceberg potential upstream. A secondary objective is to learn more facts about icebergs, including progressive location and distribution, travel time, drift rates, mortality rates, survival percentages, deterioration, and other characteristics. Other secondary objectives include the determination of sea ice conditions in order to learn and understand their correlation with iceberg conditions and the development of the relationship between iceberg conditions and climatology. Two 1964 preseason northern surveys were conducted, the first during 3–5 December 1963 from Newfoundland to Cape Dyer, Baffin Island and the second during 26–28 February from Newfoundland to Cape Chidley, Labrador.

After termination of the 1964 International Ice Patrol there was an increase in northern ice reconnaissance. A systematic monthly determination of ice conditions for the entire Grand Banks-Newfoundland-Labrador area was commenced in September. The main objective was to maintain year-round cognizance of ice conditions from the Grand Banks to northern Labrador. Secondary objectives included the eventual establishment of average monthly iceberg distribution from the Grand Banks to northern Labrador, the determination of monthly sea ice conditions and correlation with iceberg distribution, and the obtaining of more general facts about bergs, their drift and deterioration as related to climatological and oceanographic factors.

FIGURE 62.—3-5 December 1963 Iceberg Survey, Newfoundland to Cape Dyer, Baffin Island.

The first in this series of monthly determinations of ice conditions from the Grand Banks to northern Labrador was conducted 21–22 September. Monthly ice conditions for Newfoundland-Labrador were also determined by aerial reconnaissance on 21 October, 10 November, and 6 December. The October and December Newfoundland-Labrador ice conditions were observed as part of northern ice surveys scheduled and conducted at those times for the main purpose of determining the available Grand Banks iceberg supply for 1965. The 21–23 October 1964 survey also included the Hudson Strait and Frobisher Bay entrance, the east coast of Baffin Island to Cape Dyer, and the western half of Davis Strait and Baffin Bay north of Cape Dyer. The 6–8 December 1964 survey was conducted from Newfoundland north to Cape Christian, Baffin Island. The above surveys are discussed in detail later in this section.

PRESEASON 1964 NORTHERN ICE SURVEYS

The first 1964 preseason northern ice survey was conducted during 3–5 December, covering waters of the continental shelf from Newfoundland to Cape Dyer, Baffin Island. This survey was of considerable interest as it was a month earlier than the first 1963 preseason survey and it extended farther north, covering the coastal waters of southeast Baffin Island to Cape Dyer in addition to the Labrador coast and the Hudson Strait entrance. A report by the Canadian Department of Transport that sea ice conditions in the Hudson Strait and southeast Baffin Island coastal region were the worst on record aroused apprehension about the possibility of a heavy iceberg year for the Grand Banks in 1964. The 3–5 December 1963 ice survey included three ice observation flights. The first flight of 3.9 hours from Argentia to Goose Bay, Labrador, covered the Labrador Current from northeastern Newfoundland to near Belle Isle, up the Labrador coast and into Goose Bay via Hamilton Inlet. The second flight of 6.9 hours from Goose Bay to Sondrestrom, Greenland and the third flight from Sondrestrom to Argentia covered the Labrador coast to 50–60 miles offshore, the entrance to Hudson Strait and Frobisher Bay, and the Baffin Island coast to 90 miles offshore to 67°30′ N. thence 40 miles either side of a line from Cape Dyer, Baffin Island to Holsteinsborg, Greenland. Visual effectiveness averaged 90 percent overall for the three flights. A total of 532 bergs were counted visually and by radar, distributed as follows:

	Bergs
South of 57° N	10
57° N. to Cape Chidley	114
Hudson Strait Entrance	71
63°30′ N. to 65° N	236
65° N. to 67°30′ N	101
Total	532

There were an estimated additional 50 bergs in the survey area not sighted, due to poor or incomplete coverage in a few areas, mainly east of Resolution Island. The first noticeable concentration of about 26 bergs was located between 57° N. and 58° N., most of them being small, fairly close ashore, and probably aground. Between 58° N. and Cape Chidley there were about 80 bergs mostly within 20 miles off the coast and many probably temporarily aground. At least half of these were medium or large bergs. There was no sea ice south of 59°20′ N. except for some slush ice in protected waters. North of Hudson Strait entrance the sea ice limits were approximately 100 miles offshore, generally paralleling the Baffin Island coast. See figure 62 for the flight tracks and ice pot. Berg sizes were estimated as follows:

	Small	Medium	Large	Very large	Total
South of Cape Chidley	65	46	12	1	124
Cape Chidley to Cape Dyer	109	181	108	10	408
Total	174	227	120	11	532

The impression was strong that bergs were generally larger than those observed during the preseason 1963 northern surveys.

The second 1964 preseason northern ice survey was conducted during 26–28 February from Newfoundland to just north of Cape Chidley, Labrador. The first flight of 8.6 hours on 26 February from Argentia to Argentia covered the area north and west of a regular preseason flight made on 23 February. The second flight of 9.8 hours from Argentia to Argentia, including a fuel stop at Goose Bay, covered the area north of the 26 February flight to just north of Cape Chidley from the Labrador coast to 80–90 miles offshore. Visual effectiveness for both flights was 95 percent. See figure 63. A total of 901 bergs were counted during the 2 flights. There were three other known bergs sighted south of the survey area on 23 February. Additionally there were an estimated 40 bergs not sighted in the survey area due to incomplete coverage, for an estimated total of 945 bergs including 900 south of Cape Chidley as of 28 February 1964. Bergs were distributed as follows:

Area	Size				Total
	Small	Medium	Large	Very large	
South of 48° N.	1	0	1	0	2
48° N. to 50° N.	0	2	0	0	2
50° N. to 52° N.	65	61	4	0	130
52° N. to 54° N.	28	25	6	1	60
54° N. to 56° N.	180	90	28	2	300
56° N. to 58° N.	100	85	23	2	210
58° N. to Cape Chidley	50	85	17	3	155
Cape Chidley to 61°30′N.	16	20	8	1	45
	445	363	87	9	904

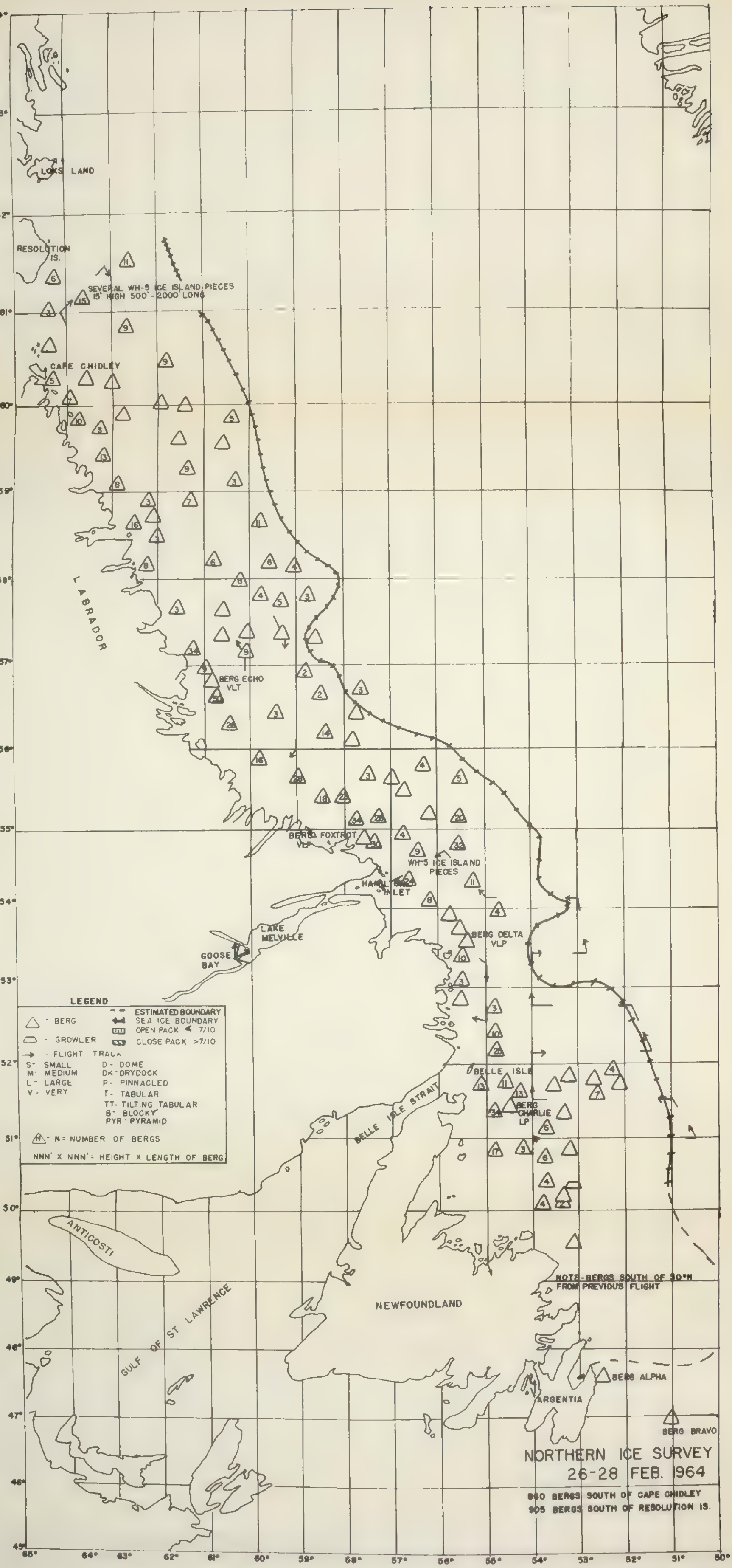

FIGURE 63.—26 28 February 1964 Iceberg Survey, Newfoundland to Cape Chidley, Labrador.

Of special note were the sightings of several flat tabular bergs about 15 feet high and of various widths and lengths up to 2,000 feet. These bergs were believed to be fragments of the ice island blocking Kennedy Channel in the spring and summer of 1963. Sixteen ice island fragments were sighted off Hamilton Inlet, five scattered from Hamilton Inlet to Cape Chidley and eight very closely concentrated near 61°15′ N., 63°30′ W.

The ice island, designated WH–5, was first sighted in February of 1963 by a U.S. Navy "Bird's-eye" flight. At that time WH–5 was lodged across Kennedy Channel north of Hans Island between Ellesmere Island and Greenland and measured 6 x 13 miles. WH–5 drifted free and broke up into three major pieces and several small fragments in late July 1963. The three major fragments designated Alpha, Bravo, and Charlie were observed several times by U.S. Navy aircraft, by the USCGC *Evergreen*, the Ice Patrol Oceanographic vessel, and by the USCGC *Westwind* during the next 2 months as they drifted into Kane Basin and Smith Sound. Charlie (2 x 3 miles) apparently drifted free of Smith Sound in the south-seeking current system in mid-August when it was last sighted. Alpha (4 x 6 miles) did not drift free of Smith Sound until late September. It is believed Bravo (1 x 5 miles) had broken up into smaller fragments before late September in the vicinity of Alpha. It is believed that the fragments sighted off Hamilton Inlet in February originated from Charlie, and that the pieces off Cape Chidley originated from Alpha. Charlie or its fragments were believed between Cape Dyer and Cape Christian on 4 December 1963 as there were no sightings of them under excellent visibility conditions during the 3–5 December survey.

Analysis of the information obtained from the two 1964 preseason northern ice surveys combined with results from the regular preseason and seasonal Ice Patrol Flights enabled the following determinations for the 1964 berg crop:

1. An estimated 15 bergs, all south of 58° N. during the first survey, deteriorated prior to the February survey.

2. An estimated 40 bergs south of Cape Chidley stayed aground during most of the period between surveys. An estimated 75 bergs remained trapped or aground between Cape Chidley and Cape Dyer between surveys.

3. Of the 124 bergs located south of Cape Chidley on 4 December, an estimated 70 made significant movement toward the Grand Banks between surveys. It is estimated that about 50 of these 70 bergs drifted south of 48° N. before the end of March, all close along Avalon Peninsula. An estimated 10 others probably drifted south of 48° N. in April; thus an estimated 48 percent of the total 124 bergs survived to south of 48° N.

4. Of the 900 bergs estimated south of Cape Chidley on 28 February, 41 percent survived to south of 48° N.

5. An estimated 780 bergs drifted south past Cape Chidley between surveys. There were an estimated 450 bergs between Cape Chidley and just north of Cape Dyer in early December. As an estimated 75 of these bergs remained close ashore north of Cape Chidley, an estimated 405 bergs that were north of the December survey managed to drift south of Cape Chidley by late February. The leaders of this group, including several ice island fragments, were located off Hamilton Inlet and had advanced about 250 miles along the current system toward the Grand Banks in 86 days for an average rate of 9.9 miles per day. Winds were evaluated as favorable for drift toward the Grand Banks between surveys for this particular group.

6. The first group of about 75 bergs arrived at the Grand Banks between 48° N.–49° N. at mid-March. This group consisted of about 50 bergs located between 50° N. and Cape Chidley on 4 December and 25 bergs from Cape Chidley to Resolution Island. These bergs had drifted to near 51° N., 54° W. on 28 February for an average drift rate of 7.6 miles per day between surveys. The average travel time for the group from Cape Chidley was estimated to be about 3½ months at an average group drift rate of 8.2 miles per day from early December to mid-March. Winds were evaluated as favorable during the travel time of this group.

7. The second group of 100 bergs centered near 64° N., 62°30′ W. on 4 December had drifted to near 52° N., 54°30′ W. by 28 February and reached the Grand Banks between 48° N.–49° N. by 28 March. Average drift rate of this group was 9.9 miles per day between surveys and 9.3 miles per day from early December to late March. The drift rate of the second group was faster than the drift rate of the first group, most likely due to the fact that the onshore wind component for the months December 1963–February 1964 was slightly greater for the first group and it probably spent more time aground or out of the current axis. See figures 55–57. Also the first group was located closer ashore in early December than the second group. See figure 62. The second group is believed to have spent little, if any, time aground between surveys, but probably was slowed up in the vicinity of Funk and Fogo Islands between 28 February and 28 March. The estimated travel time for the second group from Cape Chidley to the Grand Banks was 3 months.

8. The third group progressed to near 54°50′ N., 56° W. on 28 February for an average drift rate of 9.7 miles per day. This group arrived at the Grand Banks between 48° N.–49° N. in mid-April for an estimated overall drift rate of 9.2 miles per day. The estimated travel time from Cape Chidley to the Grand Banks was 3 months and from Cape Dyer to the Grand Banks was 4½ months.

9. Six individual bergs observed on the early December survey were resighted and identified on the late February survey and on later Ice Patrol Flights. See table VI. While the data collected on these bergs are far from complete, by correlating with all known and assumed factors, the career of these individual bergs from the early December survey to last sighting can be intelligently postulated. Individual bergs will travel at different rates depending on many factors and it is probably more significant and useful to establish travel rates of groups. However, the data in table VI should be interesting to say the least. Note that generally the average drift rates of these bergs are slower than the rates estimated for the three groups. The basic reason for this discrepancy is that the large bergs are bound to spend more time aground than the shallower-drafted smaller ones. While positive identification was not made other than by visual observation from sighting to sighting, it is reasonably certain on the basis of shape, size, and successive locations that there were no mistaken identities. Notice the considerable differences in travel rates depending mainly on the amount of time spent aground. Note that Berg Foxtrot passed Berg Echo sometime between the 4 December and 28 February surveys, but Berg Echo managed to overtake and pass Berg Foxtrot sometime in March as the latter apparently had greater difficulty in escaping its temporary entrapment.

10. Assuming Charlie or its fragments were just north of the survey coverage of 4–6 December, they had drifted 800 miles in 4 months, an average daily rate of 6.8 miles per day, with average winds slightly unfavorable for drift toward the south. From 5 December–26 February the estimated advance was 850 miles for an average rate of 9.9 miles per day with winds averaging favorable for drift toward the Grand Banks. Charlie fragments first appeared just north of the Grand Banks just prior to mid-April having traveled 420 miles in 42 days or 10 miles per day. The average rate of advance during this entire period was 8.4 miles per day with winds evaluated slightly favorable for drift toward the Grand Banks. Travel time for Charlie fragments from Smith Sound to the Grand Banks was about 8 months. Travel time from Cape Dyer was estimated to be slightly more than 4 months. By the end of April most of the Charlie fragments were driven south to near 46° N., 51° W., by average northerly winds and a few survived to 44° N. by early May. Once removed from the pack ice, these fragments deteriorated within 20 days. There were an estimated 50 fragments in the vicinity of the Grand Banks in late April and most, if not all, were remains of the 16 ice island fragments off Hamilton Inlet on 26 February. Charlie fragments traveled past at least 250 bergs between 5 December and 28 February 1965.

11. A couple of the eight closely concentrated WH–5 fragments located 60 miles northeast of Cape Chidley on 28 February were next

observed near Notre Dame Bay on 19 May. They had traveled 765 miles toward the Grand Banks in 81 days for an average rate of 9.5 miles per day under favorable winds. If these were Alpha fragments, their overall average drift rate from Smith Sound to Notre Dame Bay was 8 miles per day and the travel time between these points was less than 8 months. Winds were evaluated slightly favorable for drift toward the Grand Banks of the Alpha fragments and perhaps about normal for the locations and months considered. The Alpha fragments were not able to survive to the Grand Banks.

12. Based on aerial observations, permanent attrition of bergs from December to early April was as follows:

Bergs south of Cape Chidley 4 December 1963—44 percent (11 percent mortalities—33 percent strandings).

Bergs between Cape Chidley-Cape Dyer 4 December 1963—18 percent (all strandings).

13. Several bergs north of Cape Dyer on 5 December were a factor in the 1964 Grand Banks ice season beginning in late April. At least 100 bergs that drifted south of 48° N. during 1964 were located north of Cape Dyer on 5 December 1963. It is estimated that about 50 ice island fragments counted as bergs south of 48° N. originated from the 16 pieces off Hamilton Inlet 26 February and may have been in the form of the one Charlie piece while north of Cape Dyer.

14. An estimated 270 (47 percent) of the 580 bergs estimated south of Cape Dyer in early December drifted south of 48° N. An estimated 100 (20 percent) of the 500 bergs estimated between Cape Dyer and Cape Christian in early December drifted south of 48° N.

15. Bergs north of Cape Chidley on 28 February 1964 were not a factor in the 1964 Grand Banks ice season. Bergs north of 58° N. on 28 February were not a factor until June. Only a couple of these bergs were estimated to drift south of 48° N.

16. Only one berg north of Belle Isle on 1 June was believed to be a factor in the 1964 Grand Banks ice season.

17. An estimated 330 (66 percent) bergs of the 500 estimated south of 56° N. on 28 February drifted south of 48° N., 320 doing so prior to 1 May. An estimated 35 (17 percent) of the 210 bergs between 56° N.–58° N. on 28 February drifted south of 48° N. all from May through July. An estimated 4 bergs of the 155 located between 58° N. and Cape Chidley on 28 February survived to south of 48° N. doing so from June to July. Overall, 41 percent of the bergs estimated south of Cape Chidley on 28 February drifted south of 48° N.

18. Very few bergs were estimated to enter Hudson Strait and become permanently trapped there during the winter of 1963–64.

19. Less than 25 bergs were estimated to have been eliminated from the 1964 crop by entering and remaining in Belle Isle Strait.

20. The coastal region of Newfoundland from Funk Island to Notre Dame Bay was a significant temporary trap for the second half of the 1964 berg crop from late April to early June.

21. An indication of the iceberg population south of Belle Isle Strait for January–September 1964 is given in table VIII. As expected, the peak of the population was during the 3 months, April, March, and May. Through April the supply of bergs from the north exceeded the deterioration. By May the cycle was reversed with the berg mortalities exceeding the new arrivals, resulting in a rapidly decreasing population by the end of June. While complete statistics were not compiled on the same basis for the area south of Cape Freels, Newfoundland, it is interesting to note that an estimated 480 bergs had arrived south of Cape Freels by 1 May, and 550 by 1 June. For the berg population south of Cape Freels at given dates see figures 17–29.

22. In early December 1963 the pack ice southern limits extended to Cape Chidley, Labrador. The eastern limits probably encompassed the Baffinland Current at this time. By late February 1964 the

Table VII. Statistics of Individual Bergs Sighted During Preseason 1964 Northern Survey and During 1964 Ice Season

Date	Position	Description size estimated	Advance between sightings-miles	Average drift rate-miles per day	Remarks
		BERG ALPHA			
4 Dec. 1963	55°35′ N., 55°30′ W.	LP 175′ H x 500′ L.			Probably aground for short periods.
30 Jan. 1964	49°42′ N., 54°42′ W.	MLP 150′ H x 500′ L.	439	7.5	Aground this date.
23 Feb. 1964	Torbay Nfld	MD	200	8.3	Believed drifted free early Feburary and grounded again off Torbay. Not identified after this date.
		BERG BRAVO			
4 Dec. 1963	57°55′ N., 60°45′ W.	MLDK 150′ H x 700′ L.			
18 Jan. 1964	49°20′ N., 53°13′ W	MDK	585	13.0	Very favorable wind.
3 Mar. 1964	46°45′ N., 51°30′ W.	MDK	175	4.2	Believed aground from about 18 Jan.–2 Feb. and considerable part of February.
13 Mar. 1964	46°45′ N., 51°05′ W.	VSDK	15	Mostly aground	Estimated deterioration by 15 Mar.
		BERG CHARLIE			
4 Dec. 1963	58°33′ N., 61°35′ W.	LP 200′ H x 600′ L.			Shape of aircraft carrier.
28 Feb. 1964	51°36′ N., 54°30′ W	LP 200′ H x 600′ L.	485	5.6	Probably stranded a few times enroute this position.
9 Mar. 1964	49°39′ N., 52°50′W.	LP	135	13.5	
1 Apr. 1964	47°10′ N., 52°40′ W.	MLD 130′ H.	150	6.8	Lasted until early June spending much time aground near Cape Race. Overall drift rate from 4 Dec.–1 Apr. 6.5 miles per day.

Table VII. Statistics of Individual Bergs Sighted During Preseason 1964 Northern Survey and During 1964 Ice Season—Continued

Date	Position	Description size estimated	Advance between sightings-miles	Average drift rate-miles per day	Remarks
BERG DELTA					
4 Dec. 1963	60°28′ N., 62°55′ W.	VLP 250′ H x 700′ L.			
28 Feb. 1964	53°35′ N., 55°35′ W.	VLP	525	6.9	Located aground on 28 Feb. No later identification.
BERG ECHO					
4 Dec. 1963	65°00′ N., 62°40′ W.	VLT 50′ H x 1500′ L.			
28 Feb. 1964	56°50′ N., 60°50′ W.	VLT	525	6.1	Believed spent considerable time aground 4 Dec.–28 Feb.
6 Apr. 1964	50°25′ N., 52°30′W.	VLT 40′ H 1500′ L.	455	12.0	Very favorable winds. Last positive identification. Believe driven east of Labrador Current prior arrival Grand Bank and deteriorated by late April.
BERG FOXTROT					
4 Dec. 1963	67°04′ N., 59°10′ W.	VLB 300′ H 1100′ L prism.			Well offshore at this time.
28 Feb. 1964	54°50′ N., 57°20′ W.	VLB prism	850	9.9	Winds very favorable and very little time spent aground between 4 Dec.–28 Feb.
19 May 1964	50°04′ N., 54°15′ W.	LB prism	340	4.2	Considerable time aground 28 Feb.–19 May.
18 June 1964	48°15′ N., 50°15′ W.	MLB prism 150′ H x 450′ L.	170	5.7	Overall travel time from Cape Dyer to Grand Banks 6½ months. Overall average drift rate 6.7 miles per day.
5 July 1964	49°05′ N., 45°35′ W.	SMDK			Last sighted. Believe deteriorated within 7 days.

pack ice virtually covered the entire Baffinland-Labrador Current system from the north to the northern Grand Banks. In 1963 greater remnants of pack ice than normal survived the summer along the east coast of Baffin Island.

Table VIII. 1964 Berg Statistics Are All Estimates Based on Aerial Observation and Reports

Period	Number berg arrivals Belle Isle during period	Accumulated number arrivals Belle Isle end period	Number berg mortalities south of Belle Isle during period	Accumulated mortalities south Belle Isle end of period	Existing population south of Belle Isle end of period
February	135	135	0	0	135
March	280	415	5	5	410
April	195	610	175	180	430
May	205	815	255	435	380
June	185	1,000	440	875	135
July	150	1,150	250	1,135	25
August	30	1,180	50	1,175	5
September	4	1,184	7	1,182	2

The following conclusions are based on an analysis of the data collected during the 1964 preseason surveys and the regular 1964 seasonal flights:

1. Bergs located in the Labrador-Baffinland Current system between 58° N. and Cape Christian, Baffin Island during early December are normally likely to be a factor in next spring's Grand Banks ice season. Small bergs located offshore south of 58° N. in early December are normally unable to survive to the Grand Banks. The main reason for the latter is that the bergs south of 58° N. in December will most likely be traveling in open water and cannot normally survive unless the pack ice overtakes them. Solid medium and large bergs south of 58° N. in early December stand a chance of making it to the Grand Banks especially if they are close alongshore and are delayed sufficiently to allow the protective pack ice to envelop them before the end of January. There are two additional possible significant sources of bergs in early December from outside the normal current system, namely, Hudson Strait and the area north of Cape Dyer and east of the survey area in Davis Strait and Baffin Bay. It is possible that bergs located in Hudson Strait to the west of the survey area can be returned to the main current system if westerly winds predominate from December to March and other conditions are favorable. It is known that many bergs can enter northern Hudson Strait inside of Resolution Island. There is no evidence that these bergs will normally exit Hudson Strait in the southern entrance north of Button Island. Taking all known and assumed factors into account, it is concluded that the 1964 berg crop traveled in the current system from off southeast Baffin Island directly across the Hudson Strait entrance to off Cape Chidley, Labrador without taking any detour into Hudson Strait. This was also true in 1963. However, Hudson Strait must be considered a possible permanent trap for a large portion of a given year's crop and it also must be considered as a possible temporary trap and therefore a possible significant source of icebergs from December–February. The 1964 preseason surveys extended only to Cape Dyer and no substantial conclusions can be made regarding the possible source of supply into the Baffinland Current between Cape Dyer and Cape Christian from the east, i.e., the glaciers from Disko Bay to Upernavik. Nevertheless, feeling is very strong that this source may be quite significant up until January especially if winds from the east to north quadrant have prevailed since late summer. Winds were evaluated as very favorable for drift toward the Grand Banks for the first half of the 1964 berg crop and slightly favorable for the second half of the crop. See table III, and figures 54–61. The winds for the 1964 berg crop overall were estimated to be slightly more favorable than normal for berg drift toward the Grand Banks.

2. Bergs north of Cape Chidley in early March are not likely to be a factor in the Grand Banks ice season unless: (a) winds and current are abnormally favorable for drift to the Grand Banks during March–June; (b) the climate is abnormally cold; (c) sea temperatures on the Grand Banks and northward are abnormally cold in June and July.

3. About 40 percent of those bergs located in or near the current system between 58° N. and Cape Dyer including Hudson Strait and Frobisher Bay entrance to 66° W. in early December can be expected to drift south of 48° N. during the coming ice season. For 1964 the estimate was over 50 percent, but it is pointed out that meteorological and oceanographic conditions were believed more favorable than normal for berg drift south and survival. About 20 percent of the bergs in the Baffinland Current from Cape Dyer to Cape Christian in early December will normally survive to south of 48° N. the next spring. For 1964 the estimate was about 25 percent.

4. On the basis of the average daily drift rates determined for the 1964 berg crop and prevailing winds, it is estimated that berg groups normally advance toward the Grand Banks during the winter and early spring at 9 miles per day. The overall drift rates of the first three groups studied were remarkably similar, 8.2, 9.3 and 9.2 miles per day respectively from 4 December 1963 to time of arrival on the Grand Banks. The group drift rates are really average daily rates of advance along the current system axis toward the Grand Banks and are likely to include grounding periods. It should also be made clear that groups cannot normally be expected to remain as a whole distinctive group enroute from Baffin Island to the Grand Banks. Bergs form groups mainly because of the existence of shoal spurs that extend well offshore and collect bergs. Eventually, when meteorological conditions are right, the collected bergs will move out into the deeper waters of the current system as a group. There is considerable dispersal of groups and also tendencies toward regrouping during their journey. A minority of bergs closer ashore than others may be trapped longer and get left behind to join another group. Another minority farther offshore may have continued to travel to catch up with another group while the remainder of the group becomes stranded. However, if observations from aerial surveys are analyzed and correlated with influential factors, the group majority can usually be identified and traced. The second and third groups moved faster than the first group because they were located farther offshore during the 4 December survey and managed to spend slightly less time aground. The average drift rates of individual bergs for various periods of time in various locations, as listed in table VI, are very revealing. It must be kept in mind that the individual bergs studied were all large bergs and presumably spent much more time

aground than groups as a whole. Larger bergs will travel at rates comparable to smaller bergs if they can manage to remain sufficiently offshore to avoid the numerous shoal areas en route. Over long distances chances are against the latter occurring. The travel rates of the WH–5 ice island fragments are of special interest, as in the late summer of 1963 they were located in the vicinity of iceberg producing glaciers in northwest Greenland, specifically those in Kane Basin and Melville Bay. In early autumn of 1963 they were located in northwestern Baffin Bay, an area also easily reachable at this time by bergs calved in June and July from all the iceberg glaciers from Melville Bay south to Upernavik. If bergs calved near Upernavik in late July drifted north in the West Greenland Current and then west as supposed toward northwestern Baffin Bay at a rate of 5 miles per day, they would arrive off Jones Sound by the end of September. Bergs making better time could arrive there at this time from Disko Bay, the most distant glacier in northwest Greenland from the area in question. The fact that ice island fragments did arrive at the Grand Banks in early April is conclusive proof that bergs calved from the iceberg producing glaciers of northwest Greenland during a given summer can make it to the Grand Banks by next spring. Ironically, the medium bergs have a better chance than the larger ones in this case. This is not to say that the whole of a Grand Banks iceberg crop for a given season was calved the previous summer. A given season's Grand Banks crop undoubtedly includes a combination of bergs calved the previous 3 or 4 summers. Bergs have difficulty in getting clear of their parent glaciers and many spend a couple of years trapped in the vicinity. The biggest hurdle that must be overcome in order for a berg to survive to the Grand Banks is to properly time its arrival into the Baffinland-Labrador Current system so as to travel most of the route in protective pack ice. It is estimated that bergs of medium or small size do not normally survive more than 3 summers in Baffin Bay. Large bergs probably survive up to 5 years there. As pack ice normally disappears for about 2 months in the vicinity of the northeast Greenland glaciers, considerable berg deterioration probably occurs there each summer. More observations in Baffin Bay are required to test the validity of these assumptions.

5. The travel time of a berg group from Cape Chidley to the Grand Banks is normally about 3 months. The travel times of the three 1964 groups were close to 3 months during the winter months under estimated slightly more favorable than normal wind conditions for berg drift to the Grand Banks. However, it is believed that under very favorable conditions, a group, or at least a few individual bergs, can travel from Cape Chidley to the Grand Banks in 2½ months. The travel time of berg groups from Cape Dyer to the Grand Banks is normally about 4½ months during winter and early spring. The

travel time of bergs located in northwest Baffin Bay in late summer to the Grand Banks is normally about 8–9 months.

6. Permanent attrition of bergs along the Labrador coast during the winter months is rather small. Belle Isle Strait may be a significant trap for small and medium bergs especially if onshore winds predominate as bergs approach this area. The majority of bergs normally progress towards the Grand Banks in spite of temporary delays due to grounding. A most important factor here is that long periods of onshore winds may effect delays in berg group travel which significantly decrease the chances of the group surviving to the Grand Banks. The coastal area of Newfoundland from Funk Island, Fogo Island and into Notre Dame Bay is a most important berg trap during the ice season. Many years, bergs will be trapped and collected in this area for lengthy periods before being driven out and back into the Labrador Current by southwesterly winds. The Grand Banks pack ice usually reaches its peak extension in late March and early April. Berg attrition will be more rapid and berg penetration less extensive if arrival to the Grand Banks is delayed until after early April.

7. Deterioration by melting or calving of growlers is insignificant for those bergs traveling toward the Grand Banks in the pack ice during winter and spring. There is no significant deterioration until bergs are released from the pack ice. The longer bergs remain in the pack ice and the closer they can reach to the Tail of the Banks in the pack ice, the more chance they have to survive to the major shipping lanes. The correlation between pack ice and the Grand Banks berg problem is most distinct. A berg group will mostly deteriorate within 3 months in the open sea and out of the pack ice. Only the large bergs may remain for perhaps a month longer dependent on sea temperature and state of the sea.

8. The December 1963 survey failed to locate any icebergs south of Cape Dyer in eastern Davis Strait. It is concluded that most if not all the Grand Banks berg crop drifts south past Cape Dyer. When it is realized that most of the southwest coast of Greenland is normally free of sea ice year round and that portions of the southeast coast of Greenland normally become free of sea ice from midsummer until late autumn, it is easy to understand why bergs diminish rapidly from Cape Farwell to Holsteinsborg. The East Greenland glaciers are unquestionably a negligible source of supply for the Grand Banks of Newfoundland.

9. A normal supply of bergs located in early December between 58° N. at the Labrador east coast and Cape Christian, Baffin Island, including the entrance to Hudson Strait and Frobisher Bay to 66° W., is considered to be about 1,250 bergs, 700 (35 percent small, 50 percent medium, 15 percent large) south of Cape Dyer and 550 (25

percent small, 50 percent medium, 25 percent large) north of Cape Dyer. A normal supply of bergs located in late February south of Cape Chidley is about 1,100 bergs (48 percent small, 40 percent medium, 12 percent large), 600 south of 56° N. and 500 north of 56° N. Any evaluation of a supply must take berg size into account.

10. Normally 40 percent of the bergs located between 58° N. and Cape Dyer and 20 percent of the bergs between Cape Dyer and Cape Christian in early December will drift south of 48° N. next spring. Normally 35 percent of the bergs located south of Cape Chidley and 55 percent of the bergs located south of 56° N. in late February can be expected to drift south of 48° N.

11. The first group of bergs that arrive at the Grand Banks during an ice season probably normally includes a few bergs which were south of Cape Chidley in early December and large enough to survive. However, normally, most of the first group arrivals are located in the vicinity of Hudson Strait in early December.

12. The relationship of sea ice to the berg problem has become very apparent. The pack ice limits normally advance toward the Grand Banks beginning in autumn from Baffin Bay reaching a maximum quantity and maximum southern and eastern encroachment by the end of winter or start of spring. During the spring the pack ice limits begin to recede northward and westward from the Grand Banks. The recession of the limits becomes rapid in the summer months and the pack ice diminishes to a minimum in quantity and undergoes a maximum retreat to the north by the end of summer. Normally, the entire Labrador Sea and most of Davis Strait and Baffin Bay become free of sea ice by mid-September. The cycle then reverses. The advance and retreat of the Grand Banks iceberg crop is closely related to the advance and retreat of the pack ice. The maximum quantity and southernmost and easternmost extension of the iceberg crop on the Grand Banks normally occurs a month or two following the time of maximum pack ice on the Grand Banks. The recession of the berg crop from the Grand Banks follows the recession of the pack ice by about 3 months. The minimum quantity of icebergs south of Baffin Bay is probably about mid-November or about 2 months after the time of minimum pack ice. One obvious conclusion is that berg concentrations will not survive more than 3–4 months in unprotected waters. Some large solid bergs may survive longer if the water temperature remains cold enough, but even here deterioration must be significant. The berg crop that arrives at the Grand Banks each spring must have traveled most of the route in pack ice. As pack ice retreats from the Grand Banks it becomes progressively more difficult for later arrivals to survive to the shipping lanes. Any significant departure from normal in pack ice conditions in the western portion of the Labrador Sea, Davis Strait, and Baffin Bay in the summer and

autumn is bound to have a distinct effect on next season's Grand Banks iceberg crop. Normally the waters south of Hudson Strait are free of sea ice for 4 months, from early August through late November. It is concluded that bergs which drift past Cape Chidley during this period can hardly expect to survive unless they are large, spend time in protected waters, or get stranded long enough for the pack ice to catch up with them before deterioration. The value of observing and monitoring ice conditions in northern areas during the late summer and autumn and determining the correlation between pack ice and iceberg conditions is emphasized.

Certain assumptions and conclusions about icebergs were made in Bulletin No. 49 of this series, based on the initial two northern surveys made by the Ice Patrol prior to the 1963 season, iceberg data obtained from the Canadian Department of Transport in 1961 and 1962 and Grand Banks iceberg data recorded over the years. It must be stated that the 1963 conclusions were based on the meager upstream data collected prior to one light and one very light ice season. Fortunately, the number of 1964 Grand Banks bergs were close to normal as was the winter and spring climate. Thus, in addition to having twice as much northern ice data to work with as a result of the 1964 preseason surveys, closer to normal conditions prevailed in 1964, which should increase the validity of the 1964 conclusions. There was general agreement between the 1964 and 1963 conclusions on the following:

1. Berg group travel time from Cape Chidley to the Grand Banks normally is about 3 months.

2. Berg group average drift rate from Cape Chidley to the Grand Banks is normally 8–9 miles per day in the winter and early spring.

3. Bergs are a minimum south of Cape Chidley in November. Most offshore bergs south of Cape Chidley in early November are not normally a factor in the next ice season.

4. Berg attrition due to deterioration is normally insignificant in winter months from the time bergs are enclosed by pack ice until released by same.

The 1964 conclusions differed from the 1963 conclusions as follows:

1. It is now believed that next year's Grand Banks berg crop is located mainly from Hudson Strait entrance to Bylot Island from the coast to 80 miles offshore in early November, or 200 miles farther north than assumed in 1963. The crop will consist mostly of those bergs that enter the Baffinland Current north of Cape Dyer in the late summer and autumn months. With all this mention of the berg crop, it should be made clear that a given Grand Banks berg crop for the coming ice season is by no means clearly distinguishable. It is not as though bergs suddenly begin to appear off Hudson Strait and exist as a sharply defined group from there to Bylot Island in early November. As stated before, bergs will probably exist south of Cape Chid-

ley at this time, but few, if any, will normally survive to the Grand Banks. North of Bylot Island and in the eastern half of Baffin Bay, bergs probably become progressively more numerous as the iceberg glaciers are approached. The majority of the bergs north and east of Bylot Island in early November that will eventually enter the Baffinland Current will do so too late and will probably perish along the way prior to arrival at the Grand Banks. Numerous bergs perish in the waters off Labrador in summer and autumn.

2. It is now believed that bergs north of Cape Dyer in early November can normally make it to the Grand Banks by late March or early April in lieu of late April as concluded in 1963.

3. It was concluded in 1963 that average berg drift was normally slower along the Baffin Island coast than along the Labrador coast. This conclusion is not supported by 1964 data, at least not for southeast Baffin Island.

4. There is a greater survival of the berg crop during the winter to south of 48° N. under normal conditions than concluded in 1963. In 1963 it was concluded that 25 percent of the bergs located from Cape Chidley to Cape Dyer in early November and 30 percent of the bergs south of Cape Chidley in mid-March would normally drift south of 48° N. It is now concluded that 40 percent of those bergs located south of Cape Dyer and 20 percent of those bergs between Cape Dyer and Cape Christian in early December will drift south of 48° N.

5. The permanent stranding of the berg crop along the Labrador coast in winter and early spring is concluded not as significant as believed in 1963.

6. The 1963 conclusions of a normal berg supply upstream in the winter was too high. It is believed that deterioration of the berg crop is normally significant until early December. Thus an estimation of a normal supply of bergs is more meaningful in early December than in November. It is now concluded that an annual supply of the next year's Grand Banks berg crop as of early December is about 700 bergs between 58° N. and Cape Dyer and 550 bergs between Cape Dyer and Cape Christian for a total of 1,250 bergs with at least two-thirds of the crop medium and large bergs.

The discrepancies of the 1963 conclusions are mainly due to three reasons.

1. The number of bergs located from Cape Chidley to Cape Dyer as of early November in 1961 and 1962 were overestimated as berg counts in September and October were used and deterioration was not accounted for. Also, no berg sizes were available. It is now believed that berg deterioration is heavy south of the pack ice limits and normally continues into November for the area south of Cape Dyer. A berg crop survey in early December would be more meaningful as

by that time pack ice normally has spread south to Cape Chidley and caught up with most of the berg crop.

2. The years 1962 and 1963 were light ice years featured by the previous winter weather patterns being unfavorable for ice drift toward the Grand Banks and survival. It was realized that the determinations made for the 1962 and 1963 Grand Banks ice season were based on data representative of light years and the 1963 conclusions made some allowance accordingly but apparently not enough.

3. It was then believed that much of the berg crop normally detoured into Hudson Strait entrance en route to the Grand Banks.

POSTSEASON 1964 NORTHERN ICE SURVEYS

During the period between the termination of the Grand Banks ice season in late July and the end of 1964, two northern ice surveys from Newfoundland to Baffin Bay and two Grand Banks, Newfoundland-Labrador ice surveys were conducted. The surveys to Baffin Bay were for the main purpose of determining the 1965 Grand Banks iceberg crop. The Grand Banks, Newfoundland-Labrador surveys were for the main purpose of commencing a series of monthly determinations of ice conditions from the Grand Banks to Cape Chidley year around. The two berg crop surveys also included determination of ice conditions along the Labrador coast. The Grand Banks, Newfoundland-Labrador ice conditions determined by flights from Argentia to Cape Chidley and return on 22 September and 10 November are discussed in another section of this bulletin.

The first northern survey to determine the 1965 Grand Banks berg supply was made 21–23 October 1964. For the first time, ice conditions were determined along the entire route of bergs from the northwest Greenland glaciers to the Grand Banks. Three flights were required as follows:

(1) 21 October; Argentia to Sondrestrom, Greenland; 6.8 hours; 95 percent visual effectiveness; coverage included Continental Shelf waters from Notre Dame Bay, Newfoundland to Cape Dyer, thence across Davis Strait to Holsteinsborg, Greeland.

(2) 22 October; Sondrestrom, Greenland to Thule, Greenland; 7.1 hours; 90 percent visual effectiveness; coverage included the coastal waters of Baffin Island from Cape Dyer to Bylot Island, Devon Island, and Ellesmere Island north to Smith Channel, thence to Melville Bay and Thule, Greenland.

(3) 23 October; Thule, Greenland to Goose Bay, Labrador; 6.8 hours; 95 percent visual effectiveness; coverage offshore of second day's flight including west half of Baffin Bay and Davis Strait. See figure 64 for track and ice plot. Bergs were distributed as follows:

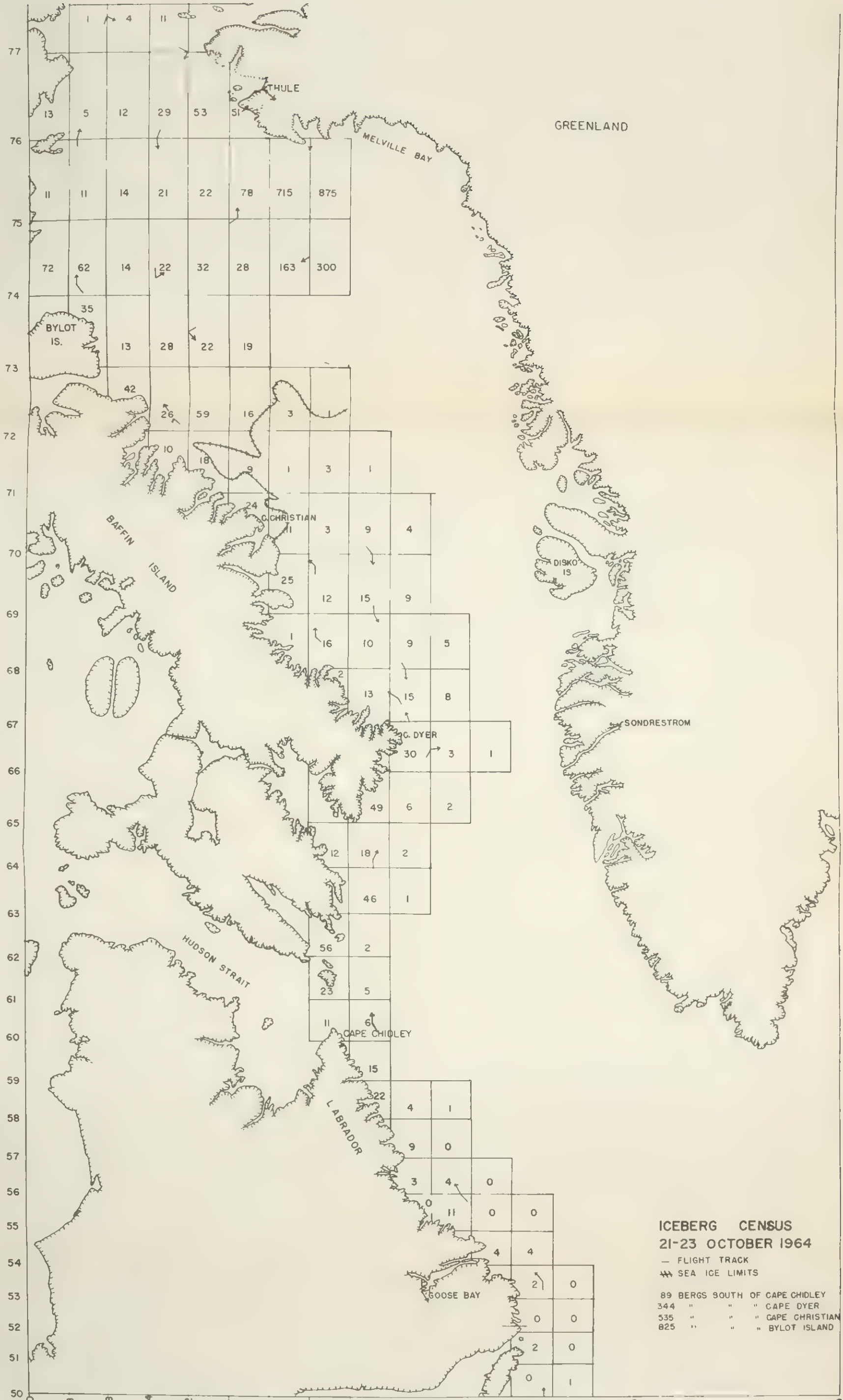

FIGURE 64.—21 23 October 1964 Iceberg Survey, Newfoundland to Baffin Bay.

Region	Size			Total
	Small	Medium	Large	
South of Belle Isle	0	1	0	1
Belle Isle to 58° N	26	13	1	40

Region	Size			Total
	Small	Medium	Large	
58°N to Cape Chidley	34	14	0	48
Cape Chidley to Cape Dyer	127	115	13	255
Cape Dyer to Cape Christian	117	60	14	191
Cape Christian to Bylot Island	122	144	24	290
Bylot Island to Devon Island	65	110	25	200
Remainder Area (see fig. 64)	(1)	(1)	(1)	2,400
				3,425

1 No sizes estimated.

Due to poor visibility in the vicinity of Hudson Strait entrance, it is estimated that as many as 25 bergs may have been missed there. Also it is estimated that as many as 100 bergs may have been missed close alongshore from Cape Dyer to Bylot Island.

On the basis of conclusions from the 1964 preseason northern ice surveys, it was assumed that the 1965 Grand Banks iceberg crop was mostly located at this time in the area from off Cumberland Sound northward along the Baffin Island Coast to about 90 miles offshore to near Devon Island. Assuming that all of the small bergs south of Cumberland Sound would deteriorate before reaching the Grand Banks and discounting all but the larger bergs south of about 58° N., the berg crop for 1965 was estimated to be about 800 bergs at this time, or less than a normal supply. As a result of the preseason northern surveys of 1963 and 1964, it was concluded that a normal supply as of early December was about 1,250 bergs. A glance at the berg sizes also indicates a lower potential for 1965, as the sizes are believed generally smaller than normal. There is no doubt that some additions to the berg crop can and will occur directly from the unsurveyed area north and east of Cape Dyer. However, any additions by this route are expected to be more than compensated for by continual deterioration of bergs south of the pack ice and by some permanent or semipermanent trappings or other elimination from the current system. It is noted that there was no sea ice south of Cape Henry Kater (69° N.). Also the number of bergs south of Cape Chidley was reduced from 192 on 22 September to 89 on 21 October indicating that the deterioration heavily exceeded the resupply during the interval for the area south of Cape Chidley. During the period 22 September–21 October, bergs drifted about 7 miles per day along the Labrador coast with neutral winds.

The next northern iceberg survey was conducted 6–8 December 1964 from Argentia, Newfoundland to Cape Christian. See figure 65. Three flights were made as follows:

(1) 6 December; Argentia to Sondrestrom, Greenland; 7.7 hours; 90 percent visual effectiveness; coverage, east coast of Labrador to 60 miles offshore, the entrance to Hudson Strait and Frobisher Bay west to 66W, the east coast of Baffin Island to Cape Dyer, and across Davis Strait to Holsteinsborg, Greenland.

(2) 7 December; Sondrestrom to Goose Bay, Labrador; 7.9 hours; 98 percent visual effectiveness; coverage, east coast of Baffin Island from Cape Dyer to Cape Christian, east of 6 December track from Cape Chidley to Cape Dyer offshore to 85 miles then to Goose Bay.

(3) 8 December; Goose Bay to Argentia; 2.6 hours; 95 percent visual effectiveness; coverage, Hamilton Inlet, Labrador and northeast coast of Newfoundland to 50 miles offshore.

The following determinations were made on the basis of the 6–8 December survey and other surveys made in the autumn of 1964:

1. Berg distribution on 7 December 1964 was as follows:

Area	Size			Total
	Small	Medium	Large	
South of Belle Isle	1	1	0	2
Belle Isle to 58° N	8	4	1	13
58° N. to Cape Chidley	18	10	0	28
Hudson Strait entrance to 66° W	18	23	12	53
Loks Land to Cape Dyer	76	65	15	156
Cape Dyer to Cape Christian	98	82	20	200
	219	185	48	452

NOTE.—It is estimated that 25 bergs were missed from Cape Dyer to Cape Christian due to incomplete coverage. Coverage was excellent in the remaining areas.

2. The assumption that bergs are normally a minimum along the Labrador coast and south in November has been strongly fortified by evidence. However, it was surprising to learn that the number of bergs south of Cape Christian on 7 December 1964 (452) was less than the number south of Cape Christian on 23 October 1964 (535). Deterioration of bergs south of Cape Christian exceeded the resupply from the north and east during this period. It is noted that on 23 October the area beginning about 60 miles south of Cape Christian to the southward was entirely free of sea ice. By 7 December, the sea ice limits had expanded to Cape Chidley. Bergs south of Cape Chidley spent the entire period in open water, as did many bergs between Cape Chidley and Cape Dyer as of 23 October. Here is more proof that deterioration of bergs in open water is substantial. The possibility of many bergs entering Hudson Strait or Frobisher Bay between surveys and consequently out of the coverage area of the December survey was

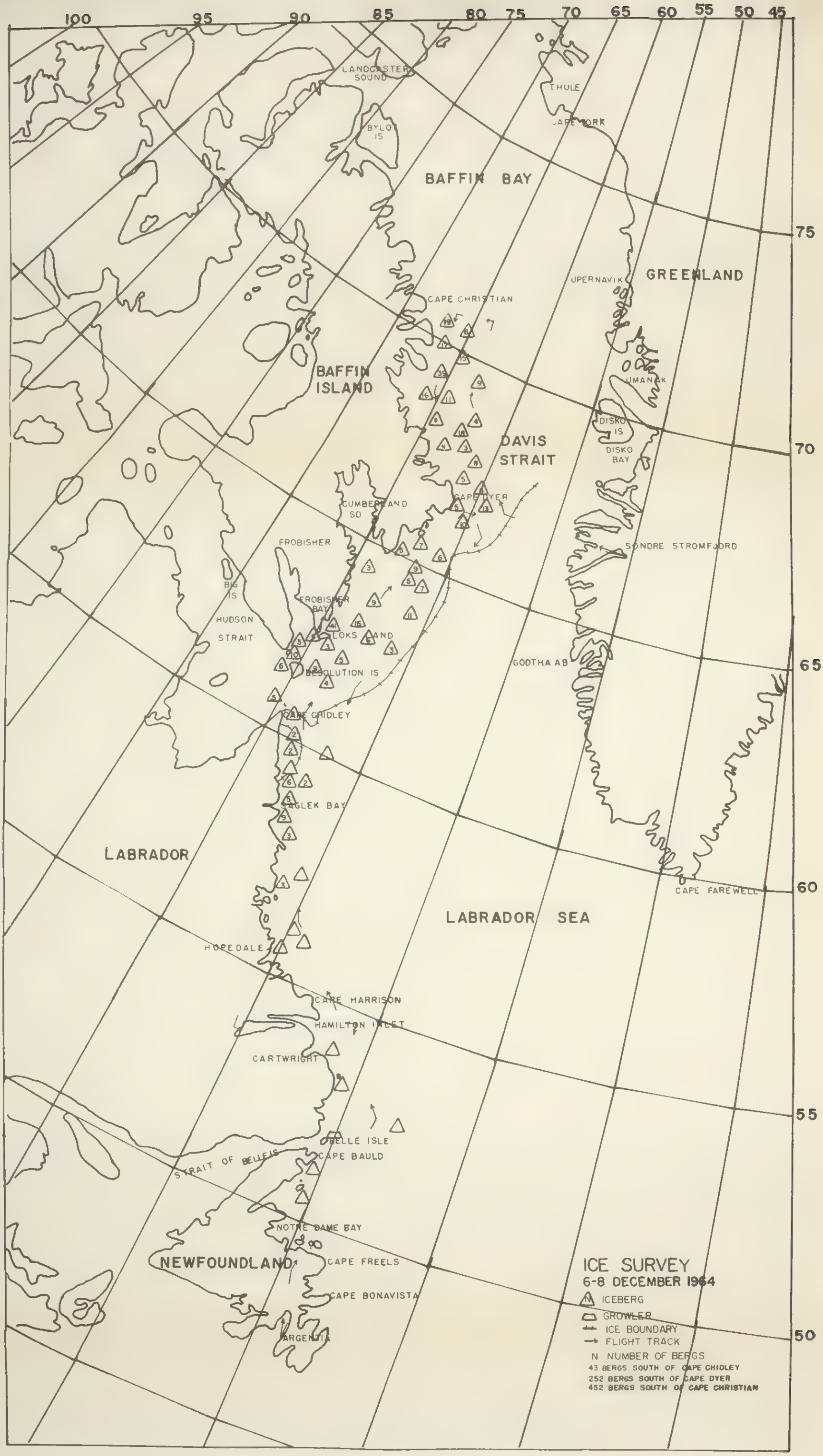

Figure 65.—6–8 December 1964 Iceberg Survey, Newfoundland to Cape Christian, Baffin Island.

considered. This possibility was discarded as the December survey had a real good look at Hudson Strait and Frobisher Bay entrance and there was no indication of a heavy movement of bergs into this area since late October.

3. The berg supply south of Cape Dyer (252 bergs; 121 S, 103 M, 28 L) was noticeably less than the supply determined in this area December 1963 (532 bergs; 174 S, 227 M, 131 L) in both total amount of bergs and in sizes. It is estimated that the autumn climate in this region was about normal. Assuming that the 1964 supply was slightly less than normal, it is obvious that the 1965 supply is less than one-half a normal supply. Accordingly, if normal climatology prevails this winter and spring, less than half a normal amount of icebergs are expected to drift south of 48° N.

4. The southern pack ice limits were located near Cape Chidley. The eastern limits extended about 60–70 miles offshore of Baffin Island. There was some slush ice close along the Labrador coast in protected waters as far south as 53°30′ N. The pack ice off Baffin Island was estimated to be less extensive in coverage and thinner than it was in December of 1963.

5. The first group of bergs expected to be a factor on the Grand Banks in 1965 are presently located in the vicinity of Hudson Strait entrance. A few of the medium bergs, presently close ashore between 58° N. and Cape Chidley, may drift free and join the first group. The first group was believed located between 63°30′ N. and Cape Dyer on 22 October and drifted at an average rate of 5.3 miles per day since then under unfavorable winds and spent considerable time aground.

6. The second recognizable concentration was centered near 64° N., 62° W. and was believed located well offshore and northeast of Cape Dyer on 23 October. This group traveled at an average rate of 6.7 miles per day and possibly spent a little time aground. It is entirely possible that this second group came directly across upper Davis Strait from the Disko Bay glaciers during the late summer and early autumn as winds favored westerly drift in this area during this time.

7. There was a large concentration of bergs, over 2,000, about 150 miles southwest of Melville Bay on 23 October. There were no other large concentrations found during this survey. Winds averaged slightly onshore at Melville Bay during July, August, and September. The pack ice conditions there in September were known to be very bad and apparently the pack ice failed to drift west and clear the area as usual. It is concluded that the same fate befell the Melville Bay 1964 berg crop and that this large concentration was mostly Melville Bay origin. This large concentration is not believed capable of reaching the Grand Banks during the 1965 ice season as it is probably a couple of hundred miles too far removed even if conditions for drift and survival to the Grand Banks were abnormally favorable. The

majority of these bergs will probably perish next summer and autumn along the route toward the Grand Banks. The apparent shortage of the 1965 Grand Banks berg crop is attributed mainly to the failure of the 1964 Melville Bay bergs to make it into the Baffinland Current before the end of October.

8. Along the same line of thought, it is concluded that the majority of a Grand Banks berg crop comes from and is located near the glaciers from Melville Bay and northward the previous summer. The remainder of the crop is made up mostly of leftovers from Davis Strait and Baffin Bay and those bergs that manage to drift directly across Baffin Bay or upper Davis Strait from the Disko Bay and Upernavik glaciers at the proper time. The leftovers may be mostly made up of Disko Bay to Upernavik glacier bergs which wintered over the previous winter and then survived the next summer in Baffin Bay while making the long classic counterclockwise trip toward and into the Baffinland Current. More surveys must be undertaken in Baffin Bay to test the validity of these conclusions.

9. On the basis of the 6–8 December survey and the conclusions made earlier in this section, 135 bergs are forecast to drift south of 48° N. during the 1965 ice season providing normal climatology prevails. If there is an abnormally favorable climate for berg drift and survival to the Grand Banks, the number could go up to 200; if the climate is unfavorable, the number would be less than 75.

The commencement of the monthly Newfoundland-Labrador coastal flights in September and the stepped up northern ice reconnaissance this past autumn have contributed a wealth of data on icebergs. Some assumptions and conclusions made in the past have been supported, while others have been modified as a result. As the northern flights are continued, the progress of the iceberg crop will be observed and correlated with all known and assumed facts and upon termination of the 1965 ice season several conclusions may be made. Details of the 1965 preseason flights will be discussed in next year's bulletin.

THE FUTURE OF THE INTERNATIONAL ICE PATROL

Over 50 years have elapsed since the International Ice Patrol first operated in 1913. It is most appropriate at this time to take an inventory and seriously reflect on what has been accomplished, what we are presently doing and where we go from here. The basic problem of the iceberg menace to trans-Atlantic shipping has not been solved. All that can be claimed is that the problem is being treated more efficiently and more effectively than before. The International Ice Patrol has not been able to eliminate the menace of icebergs to ships, but it has been able to reduce the danger of icebergs. While the loss or damage of vessels and the loss of life has been greatly reduced, it has not been completely eliminated. Nor can we reasonably expect

that it will be. The iceberg limits in the vicinity of the Grand Banks were "guarded" as best as could be expected by an Ice Patrol Vessel during each ice season (excepting the war years) from the beginning of the International Ice Patrol in 1913 until 1946. In 1946, aircraft were first used as a "supplement" to the Patrol Vessel in the guarding of the ice limits. In 1949 aircraft alone were used for guarding the ice limits. Since 1949, the International Ice Patrol has recognized aircraft as the primary means for observing ice conditions and for guarding the limits of icebergs in the vicinity of the Grand Banks. The Ice Patrol Vessel has been required only 3 years since then, 1950, 1957 and 1959, all heavy and prolonged Grand Banks ice seasons. The danger of icebergs to ships has been reduced over the years mainly as a result of scientific and technological advances of our society.

The simplest and most logical solution to the annual iceberg menace would appear to be a practicable method of destruction of icebergs before they can become a menace to shipping. Considerable effort has been exerted over the years by the International Ice Patrol to find a feasible and relatively inexpensive method for destroying or hastening the destruction of icebergs. All attempts thus far have failed to achieve any significant results. Assuming the possibility that a practicable way to destroy icebergs will one day be found, the complete elimination of the problem may not necessarily follow. Extensive ice reconnaissance to guard the approaches to the shipping lanes would remain a requirement. Even so, it must be assumed that an iceberg might slip into the shipping lanes undetected. Some years hundreds of icebergs invade the shipping lanes. The cost of destruction of all, if not most, of these menaces might be prohibitive. The International Ice Patrol has an obligation to all nations sharing its cost to ensure that said nations are getting their money's worth. There is a practicable limit to the expenditures that can be made to increase safety. The wholesale destruction of icebergs might be so expensive as to cause nations to turn to the airways as a more economical means of transport. Facetiously, replacement of ships by aircraft for trans-Atlantic transport of all passengers and cargo would eliminate the iceberg problem. At best, therefore, the destruction of icebergs, if someday a feasible method is developed, would be on a selective and small-time basis. Only during seasons when few icebergs reach the major shipping lanes, would their destruction be worthwhile.

Since efforts to destroy icebergs have proven futile at least for the forseeable future, we must explore other means to reduce the possibilities of another *Titanic*. If the iceberg menace cannot be eliminated, the least we can do is to seek to render it as ineffective as practicable. The most important step in this direction was the establishment of North Atlantic tracks. The major tracks (C, B, and A) are shifted to the south to positions normally ice-free during the ice season. These

tracks practically solve the iceberg problem most years for ships using them. Unfortunately, only a few steamship companies of a few countries are signatory to and obligated by the North Atlantic Track Agreement. Tankers, cargo vessels, and other nonpassenger vessels are exempt. The routing via the track in effect is usually longer in distance between points for trans-Atlantic vessels and for vessels plying Canadian ports or using the St. Lawrence Seaway. The track may involve over a day's additional travel time. As a matter of fact, most ships, excepting the passenger vessels, travel across the Atlantic by great circle course. Also it is pointed out that vessels en route to or from Canadian ports are permitted to use tracks E beginning 15 April and F beginning 1 July. Unfortunately these tracks are usually encumbered with many icebergs during these times. The northern shifts from D to E and E to F are apparently in tune with the expected recession of pack ice, but they do increase the menace of icebergs to ships using them. These vessels accept the extra risk of iceberg collision and feel that the saving in time, fuel, and money warrants the more hazardous route. Therefore, while the establishment of tracks has reduced the iceberg menace to shipping, the decrease of the danger of icebergs to life and property is not as substantial as might be hoped.

Attempts to eliminate the iceberg menace by destruction of icebergs have failed, but the problem has been partially solved during some years for some ships by the removal of ships from icebergs, or the establishment of tracks (C, B, and A) which are normally ice-free when in effect. However, some years, icebergs manage to survive to the southern tracks. Tracks E and F are normally threatened by icebergs in April, May, and June at times when these tracks are in effect. Also many trans-Atlantic ships take the shortest, and usually during the ice season, the most hazardous routes across the Grand Banks. Thus the iceberg menace is a threat to some ships every ice season and a threat to most ships during heavy ice seasons, in spite of the establishment of tracks. Recognizing this fact, what can be done? The obvious answer is the same now as it was in 1912. The iceberg limits must be guarded in the vicinity of the Grand Bands, ice conditions must be observed and studied, and shipping must be kept informed. The International Ice Patrol must perform these duties as efficiently as possible. In order to attempt to properly guard the iceberg limits, ice conditions must be observed often and studied continuously. The more often ice conditions are observed, the more effective becomes the guarding of the ice limits. Aside from the fact that weather can severely limit successful ice observations, there is the practical consideration of efficiency. The use of several vessels and more aircraft would no doubt result in a more effective guarding of the iceberg limits, but the increase in the effectiveness of the Ice Patrol would not be justified by the prohibitive

cost of operation. The International Ice Patrol must use judgment in deciding the manner and frequency of the observation of ice conditions. During the interval between observations, the ice environment and all significant forces acting on the ice must be studied so that ice conditions can be forecast until the next observation.

There are three basic areas where the International Ice Patrol should endeavor to improve its services; ice observing, the study of ice conditions, and dissemination of ice information. The improvement of ice observing techniques is most urgently required if the Ice Patrol is to efficiently serve shipping in the future. A diligent study must be made continuously of icebergs, their characteristics, and the forces affecting their movement and deterioration. The study of ice conditions must be zealously conducted so that ice observation can be more efficiently conducted and so that shipping can be informed twice daily of the observed or best estimate of existing ice conditions. A most effective service of study and observation of ice conditions would not be worthwhile if shipping were not properly kept informed. The International Ice Patrol must constantly seek to improve its services if there is to be any hope of ever solving the problem of the annual iceberg menace to shipping in the North Atlantic.

Before the improvement of ice observing techniques are discussed, it is necessary to consider how the International Ice Patrol has observed ice conditions and guarded the ice limits over the years. For many years, the services of the International Ice Patrol were accomplished by two Coast Guard cutters which alternated the duty as Ice Patrol Vessel. The Ice Patrol Vessel alternately guarded the most dangerous iceberg and scouted the shipping lanes or areas of reported or suspected icebergs near the Tail of Banks. From 1913 until after World War II, the Ice Patrol Vessel attempted to guard the southeast, south, and southwest limits of icebergs in the vicinity of the Grand Banks and to observe and study ice conditions without the benefit of radar and loran. When one considers the poor weather conditions almost constantly encountered in the relatively large area that had to be scouted by vessels poorly equipped, by modern standards, to navigate, and unable to locate icebergs except by visual sightings, the enormousness of the assigned task becomes apparent. In retrospect, it can hardly be claimed that the Ice Patrol Vessel was capable of guarding the iceberg limits. The International Ice Patrol annual bulletins contain many indications of the frustration and feelings of futility on the part of Ice Patrol officials who were doing the best they could with the tools available. It is true that were an additional cutter assigned to patrol simultaneously, the effectiveness would have been increased, but the cost would have been doubled. The International Ice Patrol has constantly been guided by the principle of keeping costs of operation commensurate with the services rendered.

In the old days, the Patrol Vessel relied heavily on reports of ice sightings by passing ships. In many cases the first knowledge of an iceberg in the shipping lanes was obtained from passing ships. In reality, the Patrol Vessel's action as a clearing house for ice reports was its major contribution to reducing the danger of icebergs. The Patrol Vessel often performed the valuable duty of maintaining continuous surveillance of the southernmost or most dangerous known iceberg while hoping that most if not all vessels would pass to the south of her and therefore probably steer clear of the dangerous areas. While the southern limits were guarded, the southwestern and southeastern limits could not possibly be guarded. Occasionally icebergs were sighted by ships south of what was believed the southernmost iceberg. As the current patterns are very complex near the Tail of the Banks, the southernmost berg one day might not be the southernmost the next day, unknown to the Patrol Vessel. Ships using the northern tracks E and F were more or less on their own, as the Patrol Vessel was infrequently able to observe ice conditions upstream from the Tail of the Banks. The inability to observe ice conditions upstream was a severe handicap and made the study of ice conditions difficult. As a result, bergs often drifted into the shipping tracks undetected and therefore unannounced. Needless to say navigation was poor. This combined with the poor visibility generally encountered made it difficult for the Patrol Vessel to relocate icebergs. In spite of its shortcomings, the Patrol Vessel served its purpose well considering the magnitude of its task. In 1946, after the termination of World War II, the International Ice Patrol became a land based headquarters at U.S. Naval Station, Argentia, Newfoundland. Commander, International Ice Patrol had an operations office, a radio station, and a force of three aircraft, two cutters for Ice Patrol duty, and an oceanographic vessel. The Ice Patrol was operated from 1946–48 with the dual force of aircraft and the Ice Patrol Vessel, now equipped with radar and loran, for guarding the ice limits and observing ice conditions. In 1949, for the first time, the services of the International Ice Patrol were performed without the use of the Ice Patrol Vessel. The Ice Patrol aircraft were now recognized as the major force with the Patrol Vessel a supplementary force in the conduct of the International Ice Patrol, and so it has been since 1949. Aircraft have been able to do the job of annually guarding the ice limits and observing ice conditions without the support of the Patrol Vessel all but 3 years of the past 15.

We should not be deluded into believing that the Patrol Vessel is no longer necessary to the successful operation of the International Ice Patrol. While it is true that the Patrol Vessel has not been required 12 of the past 15 years, it is also perhaps true that we have been undergoing a warm climate cycle during the last two decades or more,

resulting in much lighter than normal ice years. Ice Patrol records strongly indicate this may be true. During the first 25 years of Ice Patrol bergs were a frequent occurrence at the Tail of the Banks, and sea ice often survived to the Tail of the Banks. During the past 25 years bergs have infrequently reached the Tail and sea ice there has been a rarity. Nevertheless, in the years that lie ahead, we can expect a return to heavier ice seasons and greater increase in icebergs in the main shipping lanes near the Tail of the Banks. Unless ice observing capability by aircraft is greatly improved, it will probably be necessary to employ the Ice Patrol Vessel more frequently in the future to help guard the ice limits and to help observe the ice conditions.

The use of aircraft for ice observing has resulted in a considerably more effective International Ice Patrol. The iceberg limits can more closely be guarded and ice conditions observed and studied more effectively. Normally one successful flight on a given day can determine the probable limits of icebergs in the vicinity of the Grand Banks. However, there are situations when two flights may be necessary to insure proper coverage. Flights are normally planned to determine the limits of ice and to observe as much of the ice conditions within those limits as practicable. Flights are planned mainly on the basis of the estimated ice conditions at the time of flight. Starting with the last observed ice conditions and including ice reports, the movement of ice is forecast twice daily taking into account drift due to geostrophic current and drift due to wind. Deterioration of ice is also forecast. A reasonable safety factor is used to allow for greater drift than forecast, especially in areas of the Labrador Current. Nevertheless, bergs will, on occasion, drift unnoticed outside the forecast or even so-called observed ice limits. There is a natural inclination toward caution in flight planning to reasonably insure that there are no icebergs outside the forecast ice limits. However, there is a practicable limit to the amount of caution that can be exercised. The aircraft is limited in the amount of coverage it can reasonably handle. Furthermore, overcaution might result in failure to determine the iceberg limits and to observe the ice conditions. The number of aircraft and personnel are limited and the entire Grand Banks and vicinity could not possibly be thoroughly searched in 1 day with available facilities even if weather permitted. Those who have planned Ice Patrol flights over the years know only too well that rarely if ever can there be complete assurance that no dangerous ice lies outside the area of flight coverage. So the flight is planned to cover the probable ice limits with an added safety factor which will still permit determination of the ice conditions. Then one hopes and prays that no dangerous ice exists outside the area of coverage. Most of the time the prayer is answered. Sometimes it is not. How often the prayer isn't answered will never be known.

It is known only when a ship reports an iceberg which may be many miles outside the ice limits and in an unexplainable position. Why does this happen? It happens mainly because of the present limitations on ice observing by aircraft and vessel. Actually the area of responsibility can only partially be searched.

Even if the area of responsibility were much smaller, and more aircraft were available for ice observing to enable complete coverage, weather would rarely cooperate. Weather is a serious deterrent to the accomplishment of the mission of the International Ice Patrol. The most important portion of the area of responsibility is the vicinity of the Tail of the Banks where the main trans-Atlantic shipping tracks converge. Unfortunately, this area of complex oceanographic conditions, where the cold waters of the Labrador Current meet the warm waters of the Gulf Stream, is an area frequently plagued by dense fog. Fog normally renders ice observation by aircraft ineffective for days at a time during the crucial periods in April, May, and June, when icebergs can normally be expected at the Tail of the Banks area. The berg transport medium, the Labrador Current along the northeast and east slope of the Grand Banks, is another area frequently fogged in and characteristic of poor visibility. Under rare circumstances does the entire area of responsibility have good visibility. As the flight tracks are normally 25 miles apart, a visibility of 12½ miles is required throughout to hope for complete coverage of the areas planned. The track spacing is a compromise between the amount of area that must be searched and the probability of detection of icebergs. Two ice observers are required for each Ice Patrol flight to insure maximum visual coverage. Even so, the observers must spend time writing on the chart or in the log and cannot spend 100 percent of the time observing. When the visibility is less than 12½ miles radar is depended upon to partially fill the gap. All targets are evaluated and an attempt is made to visually identify those suspected of being possible icebergs. Unfortunately radar cannot be relied upon to register all dangerous ice in the area of coverage. Small bergs and growlers are not normally detected by radar if the range exceeds 10 miles or if sea conditions are moderate to rough. When sea conditions are very rough the larger bergs will also be missed. Even were radar able to detect all dangerous ice targets, the capability does not yet exist to distinguish an iceberg target from a fishing vessel target. There are plans in the near future to test a microwave radiometer, which if used conjunctively with radar may possibly solve the target identification problem. The success of this instrument will mean a large improvement in aerial ice observation but the inability of radar to insure complete coverage remains a serious handicap.

Another serious obstacle to aerial ice observing is imperfect navigation. In order to hope for complete flight coverage, the actual

tracks must be flown as closely as possible to the planned tracks. A 5-mile displacement of the actual track from planned track may result in considerable loss of coverage. While Doppler navigation has proven useful for Ice Patrol, there are many inherent errors in this system, especially during a normal flight featured by many diversions from track. Doppler must depend on accurate loran fixes. Loran A coverage is fairly poor over the Ice Patrol area of responsibility. Estimated positions are frequently over 5 miles in error, whereas a tolerance of ± 2 miles is considered normally necessary to obtain satisfactory coverage of the area and sufficiently accurate positions of ice sightings. When the problems of aerial ice observing are realized, it is no wonder that we are subject to suffer the same feelings of frustration and futility as suffered by the Patrol officials in the old days of operation on the Ice Patrol Vessel.

During light seasons, when ice is restricted to the northern Grand Banks, or when only a couple of bergs manage to threaten ships near the Tail of the Banks, the guarding of the ice limits and ice observation can be accomplished by aircraft alone. During heavy years, when many icebergs survive to the Tail, aircraft cannot properly do the job alone and the Ice Patrol Vessel must be used. It is easy to understand that when icebergs menace the major tracks, a ship equipped with radar, loran, fathometer, and other electronic gear essential to navigation and ice observing, is potentially a more positive and effective instrument in guarding the most dangerous iceberg, and also in limited ice observing. True, on a day of excellent visibility the aircraft will accomplish more by determining the entire limits and observing ice well within the limits. A vessel simply cannot hope to search but a small portion of the area necessary to determine the ice limits. However, within a day or two after determination of the ice limits by aerial observation, the ice conditions and consequently the ice limits may have drastically changed. Another effective ice observation flight may not be possible for days. Thus aircraft become practically useless during this time and until a successful flight can be made, whereas the Ice Patrol Vessel becomes the "ace in the hole" by being capable of searching out at least the most dangerous areas and locating, observing, and continuously guarding the most dangerous iceberg and warning ships accordingly. When many icebergs threaten the major tracks, the aircraft and the Ice Patrol Vessel are both required and complement each other in carrying out the mission of the International Ice Patrol.

The use of satellites for ice observing has been considered. Ideally a stationary satellite could hover over the Grand Banks constantly observing the ice conditions, guarding the ice limits and relaying the information to Ice Patrol Headquarters or directly to ships. However, a stationary satellite must be in an orbit too great a distance from

earth to permit the resolution of icebergs by photography. The next possibility might be an earth-orbiting satellite which would observe the ice conditions each time it passes over the Grand Banks. In order to permit resolution of small icebergs, the altitude must be so low that only a portion of the area of responsibility could be swept. The weather must be unusually excellent as cloud cover is presently an insurmountable barrier to satellite iceberg observing. There is also the cost to be considered for the performance obtained. It has been estimated that a single satellite would cost more than it presently costs to operate the entire Ice Patrol for an ice season. At best a satellite could be a minor assistance to aircraft for ice surveillance and its cost does not jusify its use for the near future.

It has been explained why the ice limits cannot practicably be continuously observed and guarded. Thus during the interval between successful observations of the ice limits by aerial reconnaissance it becomes necessary to forecast the ice conditions. The forecasting is required in order to inform shipping of the best estimate of the ice conditions twice each day. Forecasting the movement of ice between observations is also an essential ingredient in ice observing and guarding ice limits whether by ship or aircraft. The more accurate the forecasting, the more effective are the services to shipping. Accurate forecasting requires frequent and accurate ice observing and an intimate knowledge of icebergs, their environment, and the forces that affect their drift and deterioration. There is a need for short-range forecasting of ice conditions from day to day and also for long-range forecasting, weekly, monthly, and seasonal. Short-range forecasting is more urgently required as the accuracy of ice condition information disseminated daily to shipping is dependent upon same. Also effective flight planning is dependent upon accurate forecasting of ice conditions each day.

There are four basic forecasting tools that are available to the Ice Operations Officer. The chart of dynamic topography, based on a recent oceanographic survey depicting geostrophic current in berg areas on the slopes of the Grand Banks and vicinity, is used to forecast movement of icebergs due to permanent type currents. A chart of dynamic topography only partially covers the area of responsibility and it loses its value with time. It is estimated to be of little or no value within two weeks. Normal current charts are used to estimate iceberg drift in areas not covered by a recent survey. The average wind in berg areas is obtained from Fleet Weather Facility, Argentia, Newfoundland twice daily so that iceberg drift due to wind can be estimated. The above tools are used to quantitively predict the movement of ice, but deterioration must also be forecast. The deterioration of ice is imperfectly understood and forecasts are limited to qualitative guesses based on estimated sea conditions due to wind and estimated

average temperature. It is known for example that the rate of iceberg deterioration is closely related to the amount of atmospheric cyclonic activity in the area and also to the average temperature of its environment. We can monitor the weather and we have fairly accurate knowledge of the sea surface temperature based on numerous reports from ships passing through the area. Average temperatures are available only when and where the oceanographic vessel is conducting a survey.

Forecast accuracy is dependent upon the accuracy of the tools that are available. It is believed that generally the error of the geostrophic current assumed is less than 25 percent of the true values for velocity and within 20° for direction. In areas where marked variations in oceanographic conditions occur, such as the Tail of the Banks, the error may be considerably greater if the normal chart must be used. The average true wind for 12-hour periods is based on the surface weather chart at mid-period biased by any ship reports near the area. Generally, error of wind velocity assumed is believed within 20 percent of true value and the direction within 20° of true direction. When frontal systems or centers of low-pressure areas are located in the area greater error can result in estimating true wind. The relationship between wind and berg drift is imperfectly known. Wind causes a berg to move directly by exerting a physical force on the exposed portion of the berg and indirectly by generating a wind-driven current. It is known that bergs of various shapes will drift at different rates. Considerable research on the effect of wind on the drift of icebergs of various shapes and sizes must be conducted. Consideration of the effect of wind on iceberg drift has been somewhat neglected. In past Ice Patrol bulletins one sees numerous references to wind as a minor or negligible force for moving icebergs in comparison to the Labrador Current or Gulf Stream. When one realizes that the Ice Patrol Vessel operated with poor navigation equipment compared to modern standards, almost entirely at the Tail of the Banks region where current speeds of 2–3 knots are often encountered, it is easy to understand why the effect of wind was not detected except during gale force winds. Another reason why the wind as compared to geostrophic current was considered negligible is the fact that the berg draft/height ratio was believed greater than it really is. A few measurements made recently by U.S. naval submarines have indicated that an average berg draft height ratio is about 2.5/1 or 3/1. It was assumed in the past that almost all bergs were concentrated in the geostrophic currents or their branches. It should be understood that a great portion of the area of responsibility is unsurveyable by dynamic topography. It was assumed that little or no current existed in these areas believed to be barren of icebergs. The use of aircraft for observing ice conditions has revealed that a great number of icebergs can and

do drift into areas not surveyed by the Oceanographic Vessel. As a matter of fact, in 1964, at a time when almost 300 bergs were located south of 48° N., over 90 percent of them were out of the survey areas. Frequent ice observations by aircraft and the resulting study of ice conditions have sharply brought into focus the very important role played by wind in helping to determine ice conditions.

Table IX. Deterioration Time in Days for Bergs

Sea water temperature	Small berg under 50′ high, less than 200′ long	Medium berg 50′–150′ high, 200′–400′ long	Large berg over 150′ high, over 400′ long
	Days	*Days*	*Days*
32	15	40	90
36	8	16	35
40	5	10	20

NOTE

1. *For tabular type:* Small bergs less than 20′ high, medium 20′–50′, large, greater than 50′.
2. Dependent upon shape, the deterioration time can be a few days longer for solid types and a few days shorter for drydock and badly weathered pinnacled types.
3. Based on average state of sea during April–May on Grand Banks. Abnormally calm periods will increase the deterioration time while abnormal cyclonic activity will decrease same.

As mentioned before, a forecast of ice conditions must account for deterioration of ice as well as ice movement. There are no existing reliable quantitative relationships developed between the deterioration of ice and factors causing it. It is believed that the two main factors to be considered are the average water temperature and the state of the sea. If an iceberg is enveloped by pack ice, deterioration is insignificant. A crude table for berg deterioration time has been developed the past 3 years based on aerial observation and sea water isotherm charts. See table IX. Considerable research on iceberg deterioration is required to determine the importance of the various factors and to develop useful relationships for deterioration rates of different shaped and sized bergs at various average temperatures and sea conditions. The replacement of the Patrol Vessel by aircraft as the primary medium for ice observation has resulted in the loss of the intimate and continuous contact the Ice Patrol Vessel maintained with icebergs. Alas, we obtain only a fleeting glance at an iceberg every few days and often we are not sure of its identity. If true understanding of icebergs is to be developed a close and continuous surveillance of individual bergs must be included. This surveilance must be accompanied by a scientific program of data collection and analysis so that the drift and deterioration of an iceberg and the factors affecting same can better be understood.

If studies of ice conditions and the ice environment on the Grand Banks and vicinity are to be meaningful, ice conditions must be observed upstream occasionally. It is necessary that the capability be developed to accurately forecast what will happen to ice that makes the

shipping lanes near the Grand Banks, where it will go from day to day, and how long it will last. It is also necessary to be able to forecast as accurately as possible how much ice is coming and when it will arrive. In order to handle a problem intelligently it is necessary to learn as much as practicable about the problem, how it began, how it developed, and why it occurred where and when it did. Just as a field general must obtain intelligence on an enemy's strength and the deployment of his forces, so must the Ice Patrol scout the berg crop in northern areas and learn its strength and distribution as it approaches the battlefield on the Grand Banks. This is a necessity so that Ice Patrol can intelligently plan its operations, including the deployment of forces to counteract the iceberg threat.

The International Ice Patrol must observe and study the ice conditions upstream during the winter months and during the ice season as practicable as well as the ice conditions in the vicinity of the Grand Banks during the ice season. There are marked variations in the quantity and location of icebergs from year to year and it is up to the Ice Patrol to find out why. A systematic study of ice conditions and influential factors must be conducted from the source of icebergs in Northwest Greenland to the shipping lanes on the Grand Banks. An annual census of entire Baffin Bay and Davis Strait in September of each year and a monthly observation of the next season berg crop as it progresses toward the Grand Banks, is highly recommended. The observed ice conditions must be studied and correlated with measured and assumed meteorological and oceanographic elements. As our store of knowledge accumulates, the correlation between meteorological and oceanographic conditions and resulting ice conditions will be more accurately known and understood, and iceberg forecasting will be improved.

In the near future, no great requirement for improvement of the dissemination of ice information to shipping is foreseen. The radio telegraphic transmissions of the twice daily Ice Patrol ice broadcast by Coast Guard Radio Station NIK from U.S. Naval Station, Argentia are satisfactory, but somewhat inadequate in range. Shipping masters have complained about the inability to copy NIK in the eastern North Atlantic. Ships naturally want to know of the Grand Banks ice conditions as they leave port so that the track can be planned accordingly. However, the Ice Patrol ice bulletin is rebroadcast by U.S. Naval Radio Station NSS and CFH, Albro Lake, Nova Scotia, and it is probable that coverage is attained over the entire North Atlantic most of the time. Daily facsimile broadcasts of ice conditions by the Ice Patrol have been successful since 1962, and have been incorporated as a regular service to shipping. This means of dissemination of ice conditions is more rapid and more accurate. Unfortunately, only a few ship have facsimile receivers. It is anticipated that

the broadcast of ice conditions by facsimile will become the major means of dissemination in a few years.

The annual iceberg menace to trans-Atlantic shipping is here to stay at least for the foreseeable future. All icebergs that might threaten ships cannot practicably be destroyed. Destruction by laser offers some hope of reducing, but not of eliminating, the iceberg menace, and it should be investigated. When man can someday control weather, the entire berg crop might be driven out to sea and destroyed by nature between northern Labrador and Greenland and eliminated as a threat to major shipping lanes. In the meantime, all that can be done about the iceberg menace is to observe icebergs as often and effectively as practicable, forecast their movement and deterioration as accurately as possible between observations, keep shipping informed by all available means, and hope that nature will destroy them as soon as possible. Of course the guarding of the ice limits by aircraft alone or the aircraft-Patrol Vessel team, is far from perfect. There are limitations to successful ice observing including imperfect navigation, weather conditions, radar capability and insufficiently developed forecast capability. Efforts should be concentrated on eliminating or reducing these limitations, thereby improving ice observation techniques. The Ice Patrol Vessel must be called upon when a prolonged and serious threat to the major tracks at the Tail of the Banks develops. The Patrol Vessel can guard the southernmost or most dangerous iceberg, or it can be used for scouting critical areas when weather prohibits successful aerial ice observations. The founders of the International Ice Patrol recognized and directed a study of ice conditions and current conditions. An Ice Patrol research program is a necessity if the danger of icebergs to ships is to be reduced. The research program should include oceanographic surveys to determine ice environment, and to observe the drift and deterioration of individual icebergs as related to its environment. The research program should also include the study and trial of instruments and techniques for improving ice observation effectiveness, and the study of ice conditions both on the Grand Banks and in northern areas as related to meteorological and oceanographic elements.

In conclusion, it must be admitted that the iceberg limits cannot practicably be guarded continuously. There are also limitations on the capability to accurately determine ice conditions as often as desirable. The Ice Patrol makes every effort to provide the masters of ships with the most accurate ice information available. Nevertheless, it is important that the master realize that the ice information cannot be absolutely accurate. While the Ice Patrol does make the journey of trans-Atlantic vessels safer, it cannot assure their safety. The safety of each vessel is in the hands of its master. Nothing can

replace the customary caution required of vessels transitting an area that is normally frequented by poor visibility or heavy fog and dangerous icebergs each spring and early summer.

Ice and Weather Reports

[By Country]

Vessel	Weather reports	Ice reports
ARABIA		
SS *Cleopatra*	3	-----
BELGIUM		
SS *Good Gulf*	2	-----
SS *Lufira*	2	-----
SS *Lukuga*	1	-----
SS *Lulua*	5	-----
SS *Patignis*	------	1
SS *Stad Antwerpen*	15	6
CANADA		
SS *Baffin*	------	1
COLOMBIA		
SS *Republica De Colombia*	------	1
DENMARK		
SS *Andersmaersk*	3	-----
SS *Belgien*	3	1
SS *Bolivia*	17	2
SS *Christiansborg*	34	7
SS *Heering Rose*	15	4
SS *Helga Dan*	10	-----
SS *Kirstenskou*	7	2
SS *Lily Nielsen*	3	1
SS *Marius Nielsen*	4	1
SS *Nicoline Maersk*	5	-----
SS *Venezuela*	3	-----
SS *Vinland*	------	1
FINLAND		
SS *J. W. Paulin*	1	-----
SS *White Rose*	14	-----
FRANCE		
SS *Catherine*	4	-----
SS *Chicago*	5	3
SS *Christine*	1	1
SS *Circea*	6	-----
SS *Cleveland*	18	7
SS *Commandant Bourdais*	74	36
SS *Fort Caroline*	6	-----
SS *Fort Richelieu*	5	-----
SS *Fort Royal*	5	-----
SS *France*	4	-----
SS *Jean L. D*	14	2
SS *Jeanne Darc*	12	-----
SS *Jolietie*	10	-----
SS *La Coubre*	8	-----
SS *La Resolue*	11	1
SS *Louis L. D*	5	2
SS *Marquette*	7	-----
SS *Melusine*	1	-----
SS *Philippe L. D*	44	14
SS *Tobago*	4	-----
SS *Victor Schoelcher*	3	-----
GERMANY		
SS *Andondra*	1	1
SS *Adrian*	1	-----
SS *Anna Kat Fritzen*	------	2
SS *Anneliese Porr*	7	1
SS *Baerenstein*	9	-----
SS *Berhard Howaldt*	2	1
SS *Berkersheim*	1	1
SS *Bernd Leonhardt*	14	-----
SS *Boghum*	24	7
SS *Brakersand*	9	6
SS *Brandenburg*	4	-----
SS *Brooktor*	40	1
SS *Carl Julius*	13	5
SS *Carl Traudwein*	1	1

[By Country]

Vessel	Weather reports	Ice reports
GERMANY—continued		
SS *Christian Sartori*	3	1
SS *Concordia*	------	1
SS *Congo*	20	1
SS *Constantia*	20	2
SS *Donau*	9	-----
SS *Eibe Oldendorff*	17	6
SS *Elisabeth Henriette Schulte*	6	1
SS *Elise Schulte*	6	-----
SS *Elizabeth Berger*	5	-----
SS *Ellen Klautschke*	23	-----
SS *Erato*	5	1
SS *Erika Schulte*	9	6
SS *Ernst Schroeder*	1	1
SS *Erwin Schroeder*	7	3
SS *Francisca Sartori*	8	2
SS *Geerthowaldt*	2	-----
SS *Gerdaschnell*	9	3
SS *Ginnheim*	6	-----
SS *Gottingen*	1	1
SS *Grethereith*	13	2
SS *Hanseatic*	5	-----
SS *Helga Oldendorff*	2	1
SS *Henriette W. Schulte*	3	-----
SS *Henry Horn*	------	1
SS *Heldegrad Doerenkam*	1	-----
SS *Hilde Mittmann*	21	3
SS *Hornkliff*	2	-----
SS *Ilse Fritzen*	6	1
SS *Inge*	3	-----
SS *Ingrid Weide*	2	2
SS *Isle Schulte*	11	2
SS *Johanna Oldendorff*	20	1
SS *Johannes Russ*	6	3
SS *Konsul Schulte*	19	-----
SS *Kremsertor*	16	-----
SS *Lahnsteun*	23	2
SS *Leada*	18	1
SS *Leapaul*	3	3
SS *Magedburg*	13	5
SS *Marie Leonhardt*	1	-----
SS *Martin Andersen Nexoe*	1	2
SS *Mathilde Bolten*	8	3
SS *Mellum*	8	5
SS *Methan*	4	1
SS *Mulheim Ruhr*	22	-----
SS *Neptune*	1	1
SS *Nordestern*	27	3
SS *Nordwind*	2	2
SS *Octavia*	8	-----
SS *Ophilia*	11	-----
SS *Polaris*	1	-----
SS *Pollux*	10	-----
SS *Poseidon*	3	3
SS *Praunheim*	4	4
SS *Reinhart L. Russ*	2	2
SS *Rheinstein*	13	3
SS *Roland Russ*	2	1
SS *Ruhrstein*	5	-----
SS *Rungholtsand*	18	1
SS *Saarstein*	4	2
SS *Schwanheim*	18	10
SS *Susan Nereith*	1	-----
SS *Transamerica*	1	1
SS *Transatlantic*	1	1
SS *Transcanada*	1	1
SS *Transeurope*	3	3
SS *Transpacific*	2	1
SS *Transquebec*	10	2
SS *Uranus*	16	-----
SS *Virgilia*	2	1
SS *Waldemarpeter*	24	4
SS *Weissenburg*	29	6
SS *Willi Huber*	21	2
SS *Wolfgang Russ*	21	4
GREECE		
SS *Agioi Anargyroi*	1	1
SS *Andromahci*	------	1
SS *Apollonia*	3	2
SS *Aradia*	27	15
SS *Constance*	1	-----
SS *Despina*	1	-----
SS *Elenis*	1	1
SS *Eurylochus*	10	-----
SS *Faros*	2	1
SS *K Hadjipateras*	1	---
SS *King Nestor*	1	1
SS *Nini*	1	1
SS *Orient Lakes*	1	-----
SS *Plate Trader*	6	6
SS *Queen Frederika*	1	-----

[By Country]

Vessel	Weather reports	Ice reports	Vessel	Weather reports	Ice reports
GREECE—continued			ITALY—continued		
SS *Thetis*	1	-----	SS *Giacinto Motta*	13	-----
SS *Thois Costas*	14	1	SS *Integritas*	1	-----
SS *World Dale*	4	1	SS *Leonardo Da Vinci*	33	-----
SS *World Glade*	2	-----	SS *Marilen*	33	-----
SS *Zakynthos*	5	1	SS *Montello*	16	-----
			SS *Pallade*	18	-----
ICELAND			SS *Peppino Palomba*	2	-----
			SS *Orobitas*	2	2
SS *Bruarfoss*	11	5	SS *Puntamesco*	30	1
SS *Godafoss*	7	-----	SS *Saturnia*	42	-----
SS *Katla*	4	4	SS *Vulcania*	19	-----
INDIA			JAPAN		
SS *G. Polydra*	1	-----	SS *Mikishima Maru*	3	-----
SS *Jalaganga*	2	-----	SS *Shikieharu Maru*	11	-----
SS *Vishva Maya*	6	-----			
SS *Waladharati*	5	2	LEBANON		
IRELAND			SS *Alheli*	2	-----
			SS *Loris*	1	-----
SS *Irish Alder*	12	2	SS *Olga*	1	2
SS *Irish Ash*	5	2	SS *San George*	1	1
SS *Irish Fir*	14	2	SS *Zepsyros*	7	2
SS *Irish Hawthorn*	------	1			
SS *Irish Oak*	17	5	LIBERIA		
SS *Irish Pine*	52	2			
SS *Irish Poplar*	2	1	SS *Ankemp*	3	-----
SS *Irish Willow*	1	-----	SS *Ark*	2	-----
			SS *Atlantic Faith*	1	-----
ISRAEL			SS *Bariloche*	24	3
			SS *Bodoro*	3	-----
SS *Deganya*	2	1	SS *Bulkoil*	1	-----
SS *Eshkol*	1	-----	SS *Calliope*	------	1
SS *Etrog*	4	-----	SS *Continental Pioneer*	25	1
SS *Hadar*	2	-----	SS *Cypress*	19	3
SS *Har Tabor*	4	2	SS *Electra*	1	-----
SS *Tel Aviv*	1	1	SS *Evvie*	1	1
			SS *Francesca*	16	11
ITALY			SS *Henri*	18	-----
			SS *Invicta*	1	1
SS *Aurelia*	42	-----	SS *Lorna*	------	1
SS *Capo Mele*	2	-----	SS *Manhattan*	1	1
SS *Capo Noli*	18	-----	SS *Marcell M. H*	3	-----
SS *Carlo Canepa*	13	-----	SS *Northking*	1	-----
SS *Cerere*	20	-----	SS *Ocean Mariner*	1	1
SS *Corallina*	1	-----	SS *Olympia*	9	-----

Ice and Weather Reports—Continued

[By Country]

Vessel	Weather reports	Ice reports	Vessel	Weather reports	Ice reports
LIBERIA—continued			NETHERLANDS—continued		
SS *Onmium Wanderer*	3	3	SS *Schiedyk*	1	1
SS *Osprey*	1	-----	SS *Sliedrecht*	11	-----
SS *Oswego Defender*	8	1	SS *Stadzwolle*	------	1
SS *Oswego Reliance*	7	4	SS *Statendam*	39	-----
SS *Pellinaion*	2	-----	SS *Utrecht*	8	-----
SS *Petroqueen*	14	-----	SS *Westerdam*	12	-----
SS *Rio Orinoco*	8	1	SS *Zafra*	1	-----
SS *Rosina Topic*	4	3			
SS *Sunset*	3	-----	NORWAY		
SS *T. L. Lenzen*	1	-----			
SS *Teresa*	5	-----	SS *Aggi*	9	-----
SS *Titanus*	------	1	SS *Alterani*	2	1
SS *Transporter*	3	-----	SS *Anatina*	1	1
SS *White River*	4	-----	SS *Anette*	3	2
SS *World Cheer*	11	-----	SS *Arabella*	1	1
			SS *Aramis*	1	-----
NETHERLANDS			SS *Beatrice*	10	-----
			SS *Belvera*	4	-----
SS *Asterope*	4	-----	SS *Ben Gazi*	3	-----
SS *Asmidiske*	5	7	SS *Bergensljord*	7	5
SS *Bawean*	13	-----	SS *Black Osprey*	5	-----
SS *Btells Prina*	------	1	SS *Borealis*	12	6
SS *Colytto*	3	1	SS *Brandanger*	24	-----
SS *Gaasterdyk*	15	-----	SS *Bronnoy*	1	1
SS *Goerre*	12	-----	SS *Buccaneer*	------	1
SS *Gorredyk*	29	-----	SS *Bulk Enterprise*	------	1
SS *Ittersum*	7	-----	SS *Cabo Frio*	------	1
SS *Kamperdyk*	8	-----	SS *Carmencita*	2	1
SS *Katsedyk*	15	-----	SS *Fabin*	3	3
SS *Kerkedyk*	39	-----	SS *Favorita*	17	8
SS *Korendyk*	18	-----	SS *Fernpoint*	4	-----
SS *Leto*	1	1	SS *Fernspring*	21	-----
SS *Maasdam*	27	5	SS *Foldenfjord*	22	8
SS *Nieuw Amsterdam*	30	1	SS *Georgia*	2	1
SS *Prins Alexander*	1	1	SS *Gerland*	1	-----
SS *Prins Casimir*	4	3	SS *Gerore*	6	6
SS *Prins Johan Willem Frisco*	11	3	SS *Grindefjell*	1	-----
			SS *Hamina*	12	-----
SS *Prins Willem*	1	1	SS *Havjarl*	------	1
SS *Prins Willem George Frederik*	------	1	SS *Heina*	1	1
			SS *Holthill*	1	1
SS *Prins Willem Van Oranje*	1	-----	SS *Horda*	36	-----
			SS *Jarita*	2	-----
SS *Prinses Irene*	1	-----	SS *Justinian*	30	1
SS *Rotte*	10	-----	SS *Lancing*	1	1
SS *Rotterdam*	21	-----	SS *Libreville*	10	-----
SS *Ryndam*	81	17	SS *Livanita*	21	6

[By Country]

Vessel	Weather reports	Ice reports
NORWAY—continued		
SS *Lord Viking*	5	4
SS *Lyngenfjored*	14	4
SS *Margarita*	5	2
SS *Margit Brovig*	27	-----
SS *Mogen*	19	1
SS *Nardo*	3	3
SS *Nopal Express*	1	-----
SS *Nordland*	1	1
SS *Norogenaes*	2	2
SS *Oslofjord*	60	13
SS *Primero*	1	-----
SS *Ravenfjell*	2	2
SS *Senorita*	2	-----
SS *Sighaug*	29	-----
SS *Skauborg*	6	1
SS *Skauma*	7	2
SS *Skiensfjord*	1	2
SS *Spica*	1	1
SS *Stove Waggon*	8	3
SS *Sunfalcon*	9	-----
SS *Sunheim*	7	1
SS *Sunndalfjord*	1	3
SS *Sunny Queen*	12	-----
SS *Svanefjell*	5	-----
SS *Ternefjell*	2	2
SS *Thorfrid*	7	-----
SS *Thors River*	5	-----
SS *Thorunn*	9	1
SS *Thorscarrier*	2	-----
SS *Tindefjell*	12	1
SS *Topdalsfjord*	4	2
SS *Trollgar*	3	2
SS *Vanabu*	12	1
SS *Vikara*	10	4
SS *Westbulk*	16	-----
PANAMA		
SS *Alvega*	1	1
SS *Daring*	14	-----
SS *Julia*	3	-----
SS *Ranger*	1	1
SS *Southriver*	5	-----
POLAND		
SS *Batory*	47	22
POLAND—continued		
SS *Clary Thorden*	1	1
SS *Dalmor*	1	1
SS *Domeyko*	27	-----
SS *Heweliusz*	1	-----
SS *Jantar*	1	-----
SS *Jowisz*	------	1
SS *Neptun*	4	4
SS *Tobrok*	23	-----
PORTUGAL		
SS *Gil Eannes*	1	1
SS *Mondego*	------	1
RUSSIA		
SS *Alapa Jevskles*	5	1
SS *Argon*	2	2
SS *Bucharest*	2	2
SS *Ivan Fedorov*	7	1
SS *Primorsk*	1	1
SS *Privolgsk*	1	-----
SS *Riga*	1	-----
SS *Salomeja Neris*	5	-----
SPAIN		
SS *Alejandro Zuzarta*	------	1
SWEDEN		
SS *Alta*	15	2
SS *Antigua*	4	-----
SS *Argo*	10	-----
SS *Arizona*	24	-----
SS *Arvidsjaur*	43	1
SS *Aurivaara*	1	-----
SS *Avafors*	1	-----
SS *Avenir*	1	1
SS *Axelgorthon*	5	1
SS *Blankoholm*	8	1
SS *Boheme*	3	-----
SS *Brahelholm*	13	1
SS *Carlsholm*	3	-----
SS *Clary Thorden*	1	-----
SS *Daren*	2	-----
SS *Falstafeen*	1	1

Ice and Weather Reports—Continued

[By Country]

Vessel	Weather reports	Ice reports	Vessel	Weather reports	Ice reports
SWEDEN—continued			UNITED KINGDOM—con.		
SS *Faust*	3	1	SS *Beaverfir*	30	8
SS *Fidelio*	5	2	SS *Beaverpine*	33	9
SS *Gripsholm*	60	-----	SS *Beechmore*	33	13
SS *Indiana*	2	2	SS *Border Lass*	------	1
SS *Isolde*	1	1	SS *Bristol City*	5	-----
SS *Kristina Thorden*	1	1	SS *British Talent*	1	-----
SS *Kungsholm*	29	1	SS *Cairndhu*	27	1
SS *Madam Butterfly*	10	-----	SS *Cairnforth*	10	5
SS *Maj Ragne*	3	2	SS *Cairngowan*	19	13
SS *Martin Thore*	11	-----	SS *Camellia*	1	1
SS *Mattawunga*	4	1	SS *Camuk Trader*	1	2
SS *Matumba*	3	-----	SS *Canberra*	10	-----
SS *Minnesota*	24	-----	SS *Cape Franklin*	------	1
SS *Monica Smith*	1	2	SS *Cape Howe*	1	2
SS *Nordia*	43	3	SS *Cape Ogtegal*	1	-----
SS *Nordica*	4	4	SS *Carinthia*	55	22
SS *Rhin*	4	-----	SS *Carmania*	51	22
SS *Sagaholm*	9	2	SS *Carrigan Head*	15	7
SS *Selma Thorden*	1	1	SS *Caslon*	2	3
SS *Stella Morina*	3	2	SS *Caxton*	22	4
SS *Tidaholm*	5	4	SS *Cheviot*	----	1
SS *Torsholm*	1	2	SS *City of Karachi*	8	-----
SS *Trisian*	1	1	SS *City of Perth*	13	-----
SS *Vaxholm*	21	3	SS *City of Winchester*	6	-----
SS *Vretaholm*	6	-----	SS *Clarkenden*	14	1
SS *Wasaborg*	11	4	SS *Clement*	6	-----
			SS *Colina*	19	12
SWITZERLAND			SS *Craig Allian*	65	13
			SS *Craig Elen*	3	5
SS *Corviglia*	16	8	SS *Crystal Ball*	1	-----
SS *Regina*	44	3	SS *Crystal Diamond*	1	1
SS *Sils*	37	1	SS *Cumberland*	11	-----
SS *Sunamelia*	1	1	SS *Cyrus Field*	------	2
			SS *Dartwood*	------	1
UNITED KINGDOM			SS *Dealmouth*	1	1
			SS *Droxford*	16	2
SS *Alaunia*	10	-----	SS *Edenmore*	25	12
SS *Aldersgate*	20	2	SS *Elizabeth Bowater*	16	2
SS *Alert*	------	3	SS *Empress of Canada*	28	11
SS *Alice Bowater*	10	5	SS *Empress of England*	28	15
SS *Andania*	35	-----	SS *Fair Try One*	------	1
SS *Arthur Cross*	------	1	SS *Formentor*	21	-----
SS *Athel Princess*	22	7	SS *Franconia*	18	11
SS *Bamburgh Castle*	7	4	SS *Gladys Bowater*	1	1
SS *Baskerville*	1	1	SS *Gloucester City*	1	1
SS *Beaverash*	36	10	SS *Glynafon*	43	9
SS *Beaverelm*	18	5	SS *Gosforth*	4	1

Ice and Weather Reports—Continued

[By Country]

Vessel	Weather reports	Ice reports	Vessel	Weather reports	Ice reports
UNITED KINGDOM—con.			UNITED KINGDOM—con.		
SS *Gothland*	5	4	SS *Nina Bowater*	7	1
SS *Granwood*	1	-----	SS *Nremun*	1	-----
SS *Welsh Herald*	2	2	SS *Oakmore*	1	9
SS *Hororata*	11	5	SS *Orecrest*	1	1
SS *Hudson Sound*	------	1	SS *Oredian*	28	10
SS *Huntsfield*	------	1	SS *Oregis*	4	4
SS *Iron Age*	2	1	SS *Oremina*	3	1
SS *Iron Crown*	6	6	SS *Orepton*	3	1
SS *Iron Horse*	9	2	SS *Overseas Courier*	29	-----
SS *Isaac Carter*	15	2	SS *Pacific Unity*	2	3
SS *Ivernia*	11	-----	SS *Parthis*	83	-----
SS *Joya Mc Cance*	13	12	SS *Phrygia*	32	5
SS *La Loma*	14	7	SS *Phyllis Bowater*	------	2
SS *Lapampa*	16	7	SS *Port Auckland*	6	-----
SS *Laurentia*	14	9	SS *Port Launceston*	13	-----
SS *Leeds City*	9	-----	SS *Port Neilson*	2	-----
SS *Letitia*	29	7	SS *Queen Elizabeth*	13	-----
SS *Lindisfarne*	15	8	SS *Queen Mary*	3	-----
SS *Lismoria*	38	8	SS *Ramore Head*	41	11
SS *London Advocate*	6	-----	SS *Rangitoto*	6	-----
SS *London Craftsman*	26	13	SS *Rapallo*	1	1
SS *Longstone*	17	12	SS *Rathlin Head*	1	1
SS *Lord Kelvin*	5	4	SS *Rialto*	17	8
SS *Lycia*	24	7	SS *River Bore*	1	1
SS *Manchester City*	7	4	SS *Roland*	10	6
SS *Manchester Commerce*	7	4	SS *Roland More*	5	4
SS *Manchester Faith*	6	2	SS *Rosewood*	4	1
SS *Manchester Fame*	10	6	SS *Ruthlake*	1	1
SS *Manchester Mariner*	1	3	SS *Sacramento*	14	-----
SS *Manchester Merchant*	25	12	SS *Salambria*	1	1
SS *Manchester Miller*	22	5	SS *Saldanha*	24	9
SS *Manchester Port*	8	5	SS *Santona*	5	4
SS *Manchester Progress*	3	-----	SS *Saxonia*	35	5
SS *Manchester Regiment*	25	6	SS *Scottish Trader*	2	1
SS *Manchester Renown*	2	-----	SS *Severn River*	1	1
SS *Manchester Spinner*	7	-----	SS *Sheridan*	2	2
SS *Manchester Trader*	9	9	SS *Sidonia*	25	-----
SS *Marengo*	17	-----	SS *Silksworth*	------	3
SS *Mauretania*	4	-----	SS *Sir Andrew Duncan*	20	6
SS *Media*	83	5	SS *Southern Prince*	10	4
SS *Middle Sex Trader*	10	6	SS *Southwick*	7	-----
SS *Montcalm*	4	2	SS *Stanwear*	14	-----
SS *Montreal City*	7	2	SS *Sungate*	9	-----
SS *Naess Clarion*	1	-----	SS *Sunrhea*	7	-----
SS *Naess Pioneer*	17	3	SS *Surrey*	1	-----
SS *Naess Trader*	16	8	SS *Sylvania*	35	-----
SS *New York City*	13	-----	SS *Torr Head*	18	2

[By Country]

Vessel	Weather reports	Ice reports
UNITED KINGDOM—con.		
SS *Totem Queen*	18	2
SS *Totem Star*	2	2
SS *Trinculo*	56	1
SS *Uskside*	29	6
SS *Sukport*	-----	1
SS *Victore*	14	4
SS *Vrievaulx*	11	-----
SS *Wandby*	17	1
SS *Warkworth*	9	2
SS *Zinnia*	2	2
UNITED STATES		
SS *A. J. Mercury*	1	1
SS *Alcoa Ranger*	2	-----
SS *America*	75	-----
SS *African Cresent*	1	-----
SS *African Glen*	3	-----
SS *American Builder*	2	-----
SS *American Charger*	42	1
SS *American Chief*	15	-----
SS *American Clipper*	37	1
SS *American Commander*	1	-----
SS *American Contender*	18	2
SS *American Corsair*	9	-----
SS *American Courier*	-----	2
SS *American Crusader*	24	-----
SS *American Flyer*	32	-----
SS *American Forwarder*	1	-----
SS *American Manufacturer*	55	5
SS *American Merchant*	12	-----
SS *American Pilot*	50	-----
SS *American Press*	7	1
SS *American Reporter*	28	1
SS *American Scientist*	4	-----
SS *American Scout*	54	-----
SS *Atlantic*	3	-----
SS *Atlantis II*	30	6
SS *Brasil*	10	-----
SS *Eagle Transporter*	4	-----
SS *Eagle Traveler*	1	-----
SS *Eugene Lykes*	3	-----
SS *Excalibur*	10	-----
SS *Expeditor*	7	-----
SS *Export Agent*	5	-----
SS *Export Challenger*	4	-----
UNITED STATES—con.		
SS *Extavia*	5	-----
SS *Flying Independent*	3	1
SS *Flying Spray*	15	3
SS *Mallory Lykes*	6	-----
SS *Mormacbay*	21	-----
SS *Mormaccove*	28	1
SS *Mormacdawn*	1	1
SS *Mormacdove*	-----	1
SS *Mormacelm*	33	2
SS *Mormacguide*	7	-----
SS *Mormaclake*	7	-----
SS *Mormacrio*	14	-----
SS *Mormacsaga*	16	-----
SS *Mormacscan*	6	-----
SS *Mormacwren*	10	5
SS *Ocean Evelyn*	1	-----
SS *Pioneer Cove*	27	-----
SS *Remsen Heights*	5	-----
SS *Sister Katingo*	1	1
SS *Steel Advocate*	5	-----
SS *Steel Maker*	2	-----
SS *Transeastern*	14	-----
SS *Transglobe*	52	-----
SS *Wolverine State*	36	-----
SS *United States*	11	-----
SS *Žoella Lykes*	1	-----
URUGUAY		
SS *Nortemar*	1	-----
YUGOSLAVIA		
SS *Idrija*	19	-----
SS *Kormat*	26	7
SS *Natko Nodilo*	18	-----
SS *Zenica*	5	-----
U.S. GOVERNMENT COAST GUARD		
USCGC *Barataria*	69	1
USCGC *Bibb*	42	7
USCGC *Cactus*	1	-----
USCGC *Campbell*	60	-----
USCGC *Casco*	57	9
USCGC *Castle Rock*	47	8

Ice and Weather Reports—Continued

[By Country]

Vessel	Weather reports	Ice reports
U.S. GOVERNMENT COAST GUARD—con.		
USCGC *Chincoteaaue*	48	11
USCGC *Cook Inlet*	28	1
USCGC *Coos Bay*	40	-----
USCGC *Duane*	48	3
USCGC *Escanaba*	36	13
USCGC *Evergreen*	805	72
USCGC *Halfmoon*	57	21
USCGC *Humboldt*	39	-----
USCGC *Ingham*	51	4
USCGC *Mackinac*	60	1
USCGC *McCulloch*	22	-----
USCGC *Owasco*	38	12
USCGC *Rockaway*	23	-----
USCGC *Spencer*	34	-----
USCGC *Westwind*	88	64
USCGC *Yakutat*	59	3
U.S. GOVERNMENT NAVY		
USS *Betelgeuse*	3	-----
USS *McCord*	1	-----
U.S.N.S.		
USNS *Blue Jacket*	10	-----
USNS *Bondia*	6	-----
USNS *Chattahoochee*	1	-----
USNS *Chepachet*	1	1
USNS *Comet*	49	-----
USNS *Geiger*	42	-----
USNS *General Alexander M. Patch*	47	-----
USNS *General Maurice Rose*	121	-----
USNS *General Samuel B. Buckner*	108	-----
USNS *General William O. Darby*	120	-----
USNS *Greenville Victory*	9	-----
USNS *Marine Fiddler*	2	-----
USNS *Mirfak*	21	8
USNS *Norwalk*	5	-----
USNS *Pecos*	2	1
USNS *Point Barrow*	5	-----
USNS *Sargent Jonah E. Kelly*	42	-----
USNS *Taurus*	1	-----
USNS *Upshur*	58	-----
USNS *Wyndot*	63	10

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